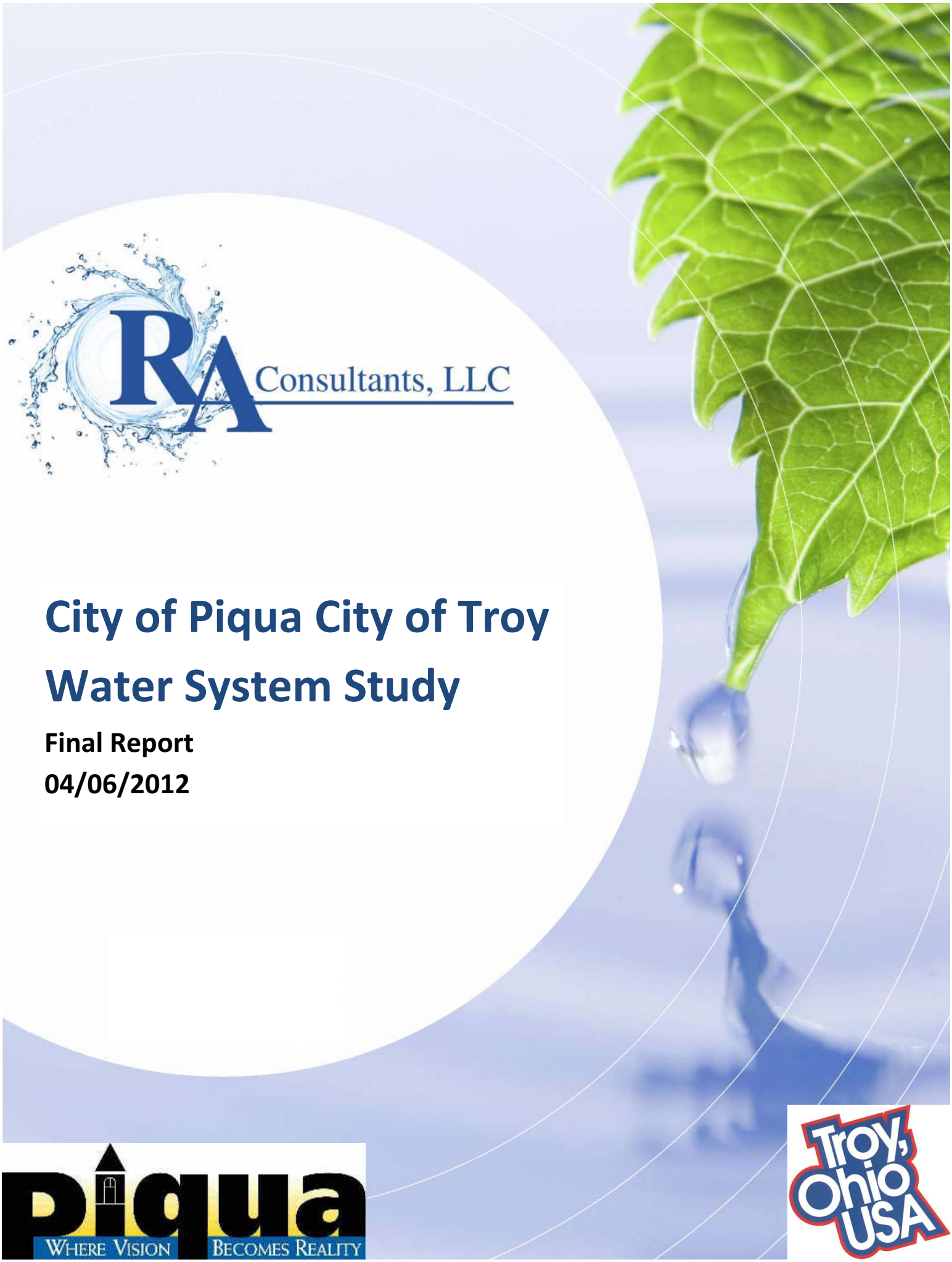


RA Consultants, LLC

City of Piqua City of Troy Water System Study

Final Report

04/06/2012

Piqua
Where Vision Becomes Reality

Troy, Ohio USA

Contents

EXECUTIVE SUMMARY 1
CONCEPTUAL DESIGN TO CONNECT THE TROY WTP TO THE PIQUA WATER SYSTEM 2
STRUCTURE AND GOVERNANCE 3
FINANCIAL ANALYSIS AND BUSINESS PLAN 4
TROY WELL FIELD ASSESSMENT 5
RECOMMENDED NEXT STEPS 6
City of Piqua City of Troy Water System Study 9
1.0 Introduction 9
1.1 Background 10
1.2 Project Overview 11
2.0 Conceptual Design of Optimal Treatment and Delivery System 12
2.1 Background 12
2.2 Operational Options 13
2.3 Water Supply from Troy 13
2.4 Capital Investment for Supply from Troy WTP to Piqua 14
2.4.1 City of Troy Well Field 14
2.4.2 Troy Water Treatment Plant Improvements 15
2.4.3 Transmission and Distribution Improvements 15
2.4.4 Transmission and Distribution Improvement Alternatives 18
2.5 Future Capital Investment in Troy WTP 18
2.6 New Water Treatment Plant in Piqua 21
2.7 Conclusions 22
3.0 Governance of a Joint Water Treatment and Supply Operation 23
3.1 Key Desired Elements/Critical Requirements 23
3.2 Options considered for Governance Model 24
3.2.1 Bulk Water Sale 25

3.2.2 Create a Water District (Ohio Revised Code Chapter 6119) 25
3.2.3 Enter into a Joint Venture Contract Agreement 26
3.2.4 Create an Independent Non-profit entity 501 (c) (3) corporation to own and operate the joint water utility 27
3.3 Case Study - Tipp City - Vandalia Joint Venture Agreement Model (Northern Area Water Authority - NAWA) 28
3.4 Outline of a Possible Governance Structure 31
4.0 Business Case Analysis 34
4.1 Base Case 34
4.1.1 City of Piqua 34
4.1.2 City of Troy 40
4.2 Joint Venture 44
4.2.1 Valuation of Assets 44
4.2.2 Operating Costs 45
4.2.3 City of Piqua 47
4.2.4 City of Troy 51
Appendix A – City of Piqua 2011 Ohio EPA Sanitary Survey Evaluation Report ..... A
Appendix B – City of Troy 2010 Ohio EPA Sanitary Survey Evaluation Report ..... B
Appendix C - Map of Proposed Water Main Service Improvements for Troy and Piqua, Ohio C
Appendix D - Eagon & Associates Well Field Assessment ..... D
Appendix E – CDM Projected Cost for New Piqua WTP ..... E
Appendix F – Document Inventory ..... F

List of Tables

Table 4-1 – Assumptions – City of Piqua 35
Table 4-2 – Five-Year Capital Pro Forma – City of Piqua 36
Table 4-3 – Five Year Operating Pro Forma – City of Piqua 37
Table 4-4 - Revenue Adjustment – City of Piqua 38

Table 4-5 – Business Plan Summary – City of Piqua 39
Table 4-6 – Alternative Business Plan Summary – City of Piqua 39
Table 4-7 – Assumptions – City of Troy 40
Table 4-8 – Five-Year Capital Pro Forma – City of Troy 41
Table 4-9 – Five-Year Operating Pro Forma – City of Troy 42
Table 4-10 – Revenue Adjustment – City of Troy 42
Table 4-11 – Business Plan Summary – City of Troy 43
Table 4-12 – Joint Venture Operating Costs 46
Table 4-13 – Project Demands for Joint Venture 46
Table 4-14 – Distribution of Joint Venture Operating Costs 47
Table 4-15 – Assumptions – City of Piqua 48
Table 4-16 – Five-Year Capital Pro Forma – City of Piqua 48
Table 4-17 – Five-Year Operating Pro Forma – City of Piqua 49
Table 4-18 – Revenue Adjustments – City of Piqua 49
Table 4-19 – Business Plan Summary – City of Piqua 50
Table 4-20 – Alternative Business Plan Summary – City of Piqua 51
Table 4-21 – Five-Year Capital Pro Forma – City of Troy 51
Table 4-22 – Five-Year Operating Pro Forma – City of Troy 52
Table 4-23 – Revenue Adjustments – City of Troy 52
Table 4-24 – Business Plan Summary – City of Troy 53

Acronyms

AD	Average Day
BV	Black & Veatch
CDM	Camp Dresser & McKee
CIP	Capital Investment Plan
I-75	Interstate 75
MCD	Miami Conservancy District
MD	Maximum Day
MGD	million gallons per day
OCLD	Original Cost Less Depreciation
OEPA	Ohio Environmental Protection Agency
OWDA	Ohio Water Development Authority
PCE	Perchloroethylene
PCS	Potential Contaminant Source
Piqua	City of Piqua, Ohio
RCLD	Replacement Cost Less Depreciation
Reproduction	Reproduction Cost Less Depreciation
SWAP	Source Water Assessment and Protection Program
TCA	Tri-cities North Regional Wastewater Authority
TCE	Tetrachloroethylene
Tipp	Tipp City
Troy	City of Troy, Ohio
USEPA	US Environmental Protection Agency
V	Vandalia
WTP	Water Treatment Plant

EXECUTIVE SUMMARY

The purpose of the "Joint Water Treatment and Water Supply Operation" study by the communities of Piqua and Troy, Ohio is to investigate the financial feasibility of creating a joint water treatment and supply utility operation, such as a water district or commission that could more cost effectively treat and supply drinking water to the two communities verses the current independent operations within the two communities.

RA Consultants, LLC in Cincinnati, Ohio was asked by Piqua and Troy to conduct the study. The project team from RA Consultants included engineers to study and recommend proposed treatment plant, system water storage, and distribution system modifications necessary to treat and move the water supply to the respective communities, as well as management and financial analysts to identify potential governance structures and costs for a proposed joint water supply operation.

Essentially the study was divided into three main questions:

1. What infrastructure would be needed to connect the Piqua and Troy systems and supply each community with potable water meeting community expectations as well as state and federal regulations?
2. How would a joint water supply utility or authority be operated and governed on behalf of the two communities?
3. Given the construction and operating costs from topics one and two above, what would a joint water supply operation cost each community and how would these costs compare with operating independent water systems?

During the study, a fourth question was posed by the City of Piqua that led to additional evaluation:

4. What is the long-term viability of the Troy well fields given the aquifer contamination identified by the USEPA and OEPA in the *East Troy Contaminated Aquifer Investigation?*

The RA Consultants team developed a conceptual design plan for how an optimal treatment and delivery system would be constructed. The plan focused on redundancy and reliability of the water supply, water quality, construction costs, and operating costs to create the optimal solution.

The team also worked with both communities to identify a structure for operating and governing a joint water supply utility or authority. The structure considered the requirements for staffing and servicing the day to day operations of the joint water supply and treatment solution. With input from both communities, the team also identified a governance structure

that gives the communities acceptable oversight of the operations, capital investments, and annual operating costs.

With all necessary cost and governance components identified, the RA team determined the costs associated with implementing the joint utility's treatment and delivery system as well as the day-to-day operations and governance. The projected costs were apportioned to each community according to the developed governance model and then compared against current comparable operating costs. In the case of Piqua, a comparison was also developed to compare costs of their own independent treatment plant verses a joint utility operation.

Finally, the RA team sought out the services of a professional hydrogeologist to conduct an assessment of the long-term viability of the Troy well fields and produce a report of their findings. Eagon & Associates from Worthington, Ohio was chosen for the task.

CONCEPTUAL DESIGN TO CONNECT THE TROY WTP TO THE PIQUA WATER SYSTEM

Piqua owns and operates a water utility consisting of a 7 MGD Water Treatment Plant (WTP) supplied by three surface water sources. According to historical and projected demands the average day finished water consumption is approximately 3.5 MGD, with a maximum day of 4.7 MGD.

Troy owns and operates a water utility consisting of a 16 MGD WTP supplied by an east and west well field with ten wells capable of producing 10.4 MGD. The average day demand in the Troy distribution system is 4.1 MGD with a recent historic maximum day of 5.5 MGD.

With the Troy WTP capable of producing 16 MGD and the average day demands of the Piqua and Troy systems totaling 7.6 MGD, there is more than adequate treatment supply available to meet both current systems requirements. However, the Troy well field limit of 10.4 MGD reduces the margin of excess capacity to around 3 MGD. Given the current slow residential and industrial growth in the potential areas of service, that presents no significant concern for source water supply in the near term. Troy already has investigated expanding the well field to match the WTP capacity by adding 2-3 new wells. A plan to implement additional raw water supply should be a part of the new joint water supply arrangement.

Combining the two community water systems into a joint operation will require capital investments to construct transmission water mains between the two communities along with booster pumping, water storage, chemical feeds, and various other related improvements. The total initial investment to join the two systems is estimated at $17,000,000. Conducting a hydraulic modeling study of the two distribution systems operating in tandem may very well result in a significant reduction in this investment.

For comparison purposes, implementing a new WTP in Piqua will require the siting and construction of the new plant, connecting to and delivering raw surface water to the plant, and commissioning the plant into operation. The total investment to build a new WTP in Piqua is estimated by Piqua's engineering consultant, CDM, at $31, 630,000.

STRUCTURE AND GOVERNANCE

The RA team worked closely with Troy and Piqua representatives through a series of focused workshops to identify an optimum bilateral governance structure for a joint water treatment and supply utility. The initial task was to develop consensus on a set of critical requirements that must be met in order for the partnership to be successful. The Troy/Piqua team developed twenty-four (24) requirements covering areas of employee/labor, joint operations, rates, and overall governance. Taking these critical requirements into consideration, the RA team presented four options:

1. Continue to pursue a wholesale (bulk) water sale from Troy to Piqua
2. Create a regional water district per Ohio Revised Code Chapter 6119
3. Enter into a joint venture agreement per Ohio Revised Code 715.02, similar to the Tipp City and Vandalia agreement that created the Northern Area Water District (NAWA)
4. Create an independent non-profit entity

In considering these options, the Troy/Piqua team concluded that the joint venture (JV) option most closely aligned with their critical requirements primarily because it would provide for co-ownership of water treatment and supply assets, as well as more control over participation and timeline. The RA team developed a case study of NAWA and arranged for the Troy/Piqua team to meet with NAWA Board and staff on December 8, 2011.

In 2002, the nearby cities of Tipp City and Vandalia executed an intergovernmental agreement creating a joint venture to be known as the Northern Area Water Authority (NAWA). The venture allows the two cities to jointly plan, finance, construct, own, and operate a water utility system. Each city holds a 50% share/ownership in the JV. NAWA contracts with Vandalia to be the fiscal agent for the Authority, and contracts with Tipp City to operate the plant and provide other administrative services. NAWA has no employees of its own; all staff remain employees of their respective municipalities. It is governed by a five (5) member Board of Participants that includes two representatives each from Vandalia and Tipp City, plus a neutral 5th member who is selected by the Board.

In outlining a possible governance structure for a JV water treatment and supply utility for Troy and Piqua, the RA team recommends that the JV contract with Piqua for accounting and auditing services, and with Troy to operate the joint facilities. The JV would only be authorized to sell water on a wholesale basis to Troy and Piqua and costs would be allocated based on water supplied to each city. Each city would continue to set its own retail rates for its

customers. A seven (7) member Board of Trustees representing top administrators and senior utility staff from each city, plus a non-community member , is recommended to oversee the utility, Each city would continue to maintain its own distribution system,, billing, , and management of water systems within their respective service area. The JV agreement would remain in place in perpetuity unless the cities agreed to its dissolution.

FINANCIAL ANALYSIS AND BUSINESS PLAN

The third element of the study is the comparison of the cost of a joint water supply operation with the operation of independent water systems. Developing business cases for each of the options provides a comparison that not only includes capital and operating costs, but incorporates timing of revenue adjustments, timing and financing of capital expenditures, and accounts for the impact of customer growth and inflation.

The base case or as-is analysis for each community reviewed the current customer base, rates, and operating and capital budgets. Construction of a new water treatment plant in Piqua will be added to the Piqua base for comparison with the JV analysis, while for Troy; the base case represents a status-quo, no change condition.

For Piqua, no growth in customer base is expected through 2013; nominal growth of 0.2% per year thereafter. Operating costs are based on the 2012 budget and incorporate annual inflation of 3%. Additional operating costs of $1,590,000 associated with the new treatment plant are based on estimates provided by CDM. All of CDM's costs are based on 2012 dollars. Borrowing, grants or some combination thereof, totaling $35 million, combined with $2.5 million in cash funding, will be required to meet the capital needs of building the new WTP. Using an average interest rate on borrowed funds of 3.5% results in a 5-year (2013-2017) required revenue adjustment of 197%.

For Troy, no growth in customer base is expected through 2013; growth of 0.5% per year is projected from 2014 through 2016; growth of 1.0% per year is projected 2017 through 2022; and 1.5% per year is projected the remainder of the study period. Operating costs are based on the 2012 budget adjusted for capital and incorporate annual inflation of 3% for the study period. Capital expenditures for the first five years of the study are estimated to total $1.5 million. The base case revenue adjustment for Troy over the period of 2013- 2017 is 23%.

The Joint Venture analysis builds on the base case for each community. Customer growth and inflationary factors are consistent between the base case and JV. The study period for the business cases is 2013 – 2035.

The sale and buy-in of the Troy water treatment plant necessitates valuing the facilities. Assets included in the value are the water treatment facilities plus the well heads. Valuation methodologies can vary significantly. For this analysis, a suggested value of $30 million is

identified as an appropriate starting point for use in analyzing the feasibility of a joint ventrue. Final valuation will be based on conditions agreed to during negotiations.

The Joint Venture will be responsible for the day to day operations of the facilities. This includes the operation and maintenance of the assets and the associated administrative costs. Troy will provide the operation and maintenance support, Piqua the administrative support. Each community will bill the JV for services rendered.

The implementation of a JV arrangement between communities will result in a required revenue adjustment for Piqua of 89% over the period of 2013 – 2017. This adjustment assumes the implementation of a 10% revenue increase in 2012. For Troy, a 12% revenue adjustment will be required over the same time frame.

TROY WELL FIELD ASSESSMENT

This report was prepared to provide an assessment of the feasibility of relying on the Troy well fields to provide a source of supply for both Piqua and Troy combined. The conclusions provided are based on a hydrogeologic analysis of available information relative to the ground water resources of the area.

The City of Troy is situated over a very prolific sand and gravel aquifer that is capable of sustaining yields that will satisfy the water supply requirements of both Troy and Piqua for the foreseeable. Because permeable materials exist at or near the land surface over the aquifer, the aquifer is highly susceptible to contamination, as is the case at many large municipal well fields in the Great Miami River Valley. Volatile organic compounds (VOCs) have been detected at both the Troy East and West Well Fields since late 1980s/early 1990s. Consequently, Troy has been aggressively involved in Source Water Assessment and Protection (SWAP) activities required by the Federal Safe Drinking Water Act.

Although VOC contamination detected in Troy's well fields presents long-term well-field management and water treatment issues it is concluded that there is no plausible scenario whereby the aquifer near Troy becomes unusable from the standpoint of both water quality and aquifer capacity. Whereas there are uncertainties about existing sources of contamination, long-term water quality concerns are considered to be manageable with available mainstream technologies.

Strategies to ensure the long-term sustainability of the ground-water supply at Troy include performing a comprehensive update of the SWAP Management Plan with emphasis on ground-water monitoring, and an active outreach program targeting the owners and employees of potential contamination sources.

RECOMMENDED NEXT STEPS

The goal of the study has been to provide the Piqua and Troy community leaders with an unbiased analysis and presentation of the facts and options for creating a joint water treatment and water supply operation. It was not the intent of the study to recommend one option over another. All of the presented options can achieve the objective of providing a reliable supply of drinking water for both Piqua and Troy. The question for the community leaders is at what cost does each option achieve that objective? Which option is the most responsible expenditure of the public's money?

Recommended next steps will obviously depend upon what option is chosen. If both communities decide to maintain independent supply operations, the recommended next steps have already been identified by the respective staffs in their project plans.

If the decision of both communities is to pursue some level of joint water supply and operations then the communities have some decisions to make to determine what path to follow. For Piqua, the challenge in any option is financial. Construction of its own water treatment plant will require rate increases of approximately 197% in the first 60 months to support the debt payments necessary for the upfront construction costs and over 800% over the next 25 years. While a joint venture and ownership approach does not require as much upfront construction costs, this option requires approximately an 89% increase in rates in the first 60 months to pay the debt incurred to purchase ownership in the joint water plant and to build the necessary infrastructure for the connections.

Piqua may also want to revisit the option of a wholesale supply contract with Troy, but include a provision in the contract that Piqua can purchase ownership in the water treatment plant 15 or 20 year into the term of the contract. This would allow Piqua to reduce the amount of debt it has to incur in the first few years by pushing about half of its expenses out 15 plus years. In a wholesale supply arrangement that includes an option to purchase ownership, Piqua would only have infrastructure connection costs in the first few years. This could potentially reduce rate increases by 50% in the first 60 months as compared to a joint venture with an upfront ownership purchase.

If the communities decide to pursue a joint water supply operation, whether it is through a joint ownership venture or wholesale supply contract, there are a number of steps the communities will need to take.

As outlined in the conceptual design and engineering section of the study, a hydraulic modeling study of the two distribution systems operating in tandem should be completed. The study identifies several ideas for potential savings in the construction and operation of a joint system. But those ideas would need to be tested through hydraulic modeling. Both communities are close to having the system data needed for a modeling study so it isn't a major effort to

complete. But it should be done to ensure that the final design will provide optimum service to the communities at the lowest cost.

Under a joint supply operation, the Ohio EPA permitting and licensing requirements will most likely change for both communities. The Piqua and Troy distribution systems would become what are referred to in Ohio regulatory language as “consecutive systems.” This would change some of the requirements for each community, though they are not onerous. Early in the development of a joint operation agreement, the communities should jointly review their plans with the Ohio EPA so that all requirements can be incorporated in any agreements.

To help identify the needed terms and conditions of a joint venture or operations agreement, a copy of the Northern Area Water Authority (Tipp City and Vandalia) agreement has been provided to each community. The NAWA agreement can be used as a template for an agreement between Piqua and Troy. During the study a high level legal review was conducted with both Piqua and Troy legal staff, but a more comprehensive review should be completed during development of an agreement.

City of Piqua City of Troy Water System Study

1.0 Introduction

The purpose of the "Joint Water Treatment and Water Supply Operation" study by the communities of Piqua and Troy, Ohio is to investigate the financial feasibility of creating a joint water treatment and supply utility operation, such as a water district or commission that could more cost effectively treat and supply drinking water to the two communities verses the current independent operations within the two communities. The Ohio Environmental Protection Agency (OEPA) has determined that the current water treatment operation in the City of Piqua (Piqua) cannot consistently remove contaminants in the source water; therefore, a new treatment process is needed. The cost of implementing a new treatment process would require Piqua to raise water rates significantly each year for several years. The nearby City of Troy (Troy) is currently operating a treatment plant that has considerable capacity above the community's needs, requiring the Troy ratepayers to carry and cover the cost of maintaining the excess capacity. The joint water supply study is intended to provide each community with the due diligence to consider and present to their citizens the positives and negatives of entering into a joint operation. For the purposes of this document the term "joint water supply utility" will refer to a regional water treatment and raw water supply operation.

RA Consultants, LLC in Cincinnati, Ohio was asked by Piqua and Troy to conduct the study. The project team from RA Consultants included engineers to study and recommend proposed treatment plant, system water storage, and distribution system modifications necessary to treat and move the water supply to the respective communities, as well as management and financial analysts to identify potential governance structures and costs for a proposed joint water supply operation.

Essentially the study was divided into three main questions:

1. What infrastructure would be needed to connect the Piqua and Troy systems and supply each community with potable water meeting community expectations as well as state and federal regulations?
2. How would a joint water supply utility or authority be operated and governed on behalf of the two communities?
3. Given the construction and operating costs from topics one and two above, what would a joint water supply operation cost each community and how would these costs compare with operating independent water systems?

During the study, a fourth question was posed by the City of Piqua that led to additional evaluation:

4. What is the long-term viability of the Troy well fields given the aquifer contamination identified by the USEPA and OEPA in the *East Troy Contaminated Aquifer Investigation?*

1.1 Background

The City of Piqua, Ohio operates a separate water treatment and distribution system with the capacity to supply 7 million gallons a day (MGD). The primary raw water sources for the treatment system are the Great Miami River and two additional surface water bodies. Average day (AD) system demand is approximately 3.5 MGD with a max day (MD) demand of approximately 4.7 MGD. Potential regulatory compliance issues concerning the current water supply and treatment process have been identified by the Ohio EPA in their annual sanitary survey. Included as Appendix A is a copy of the Ohio EPA's 2011 Sanitary Survey for the Piqua System.

Annually the Ohio EPA is required under the federal Safe Drinking Water Act to conduct an inspection of public water systems. The inspection process is referred to as a "sanitary survey."

In response to the OEPA's concerns, the Piqua water utility has been working to develop an alternative source water supply and improve treatment operations. The options being considered are 1) build a new treatment plant with a groundwater or surface water supply, or 2) get water supply from an alternative treatment operation. The community wishes to achieve a number of goals with an implemented solution, but primary among them is a level of control over assets that provide the community's water supply a reliable supply of at least 6 MGD, and a level of control over the cost for the water supply.

The City of Troy, Ohio currently operates a separate water treatment and distribution system that supplies Troy and a few additional communities through service contracts. Troy's source of water supply is a series of groundwater wells that are capable of producing 10.4 MGD with the ability to expand the well field to a production capacity of approximately 16 MGD. The Troy treatment plant has the ability to treat 16 MGD. Average day demand on the Troy system is 4.1 MGD with a peak demand of 5.5 MGD. Current average demands represent about 25% of the treatment plants capacity with an expectation for a flat to slow demand growth. Troy officials are aware that a tremendous amount of water utility expenses are fixed costs that do not change with production volume, and must be borne by the customer base regardless of demand. A smaller customer base served by an underused system experiences higher water rate than communities where treatment facilities are more fully utilized. Therefore, Troy officials are concerned that high fixed costs, rising inflationary impacts, costs to meet future regulatory requirements, and less than 50% treatment plant utilization will lead to a significant rise in water rates in the future.

1.2 Project Overview

The purpose of this joint water supply study is to evaluate the financial feasibility of creating a Piqua/Troy joint water treatment and supply utility to supply the current and future drinking water needs of both cities in compliance with the Ohio EPA and Safe Drinking Water Act regulations. Each community would continue to operate and maintain their individual water distribution systems, but would receive their water supply from the joint water treatment and supply utility.

The RA Consultants team developed a conceptual design plan for how an optimal treatment and delivery system would be constructed. The plan focused on redundancy and reliability of the water supply, water quality, construction costs, and operating costs to create the optimal solution.

The RA team worked with both communities to identify a structure for operating and governing a joint water supply utility or authority. The structure considered the requirements for staffing and servicing the day to day operations of the joint water supply and treatment solution. With input from both communities, the team also identified a governance structure that gives the communities acceptable oversight of the operations, capital investments, and annual operating costs.

Finally, with all necessary cost and governance components identified, the RA team determined the costs associated with implementing the joint utility's treatment and delivery system as well as the day-to-day operations and governance. The projected costs were apportioned to each community according to the developed governance model and then compared against current comparable operating costs. In the case of Piqua, a comparison was also developed to compare costs of their own independent treatment plant verses a joint utility operation.

2.0 Conceptual Design of Optimal Treatment and Delivery System

2.1 Background

The City of Piqua, Ohio is located approximately 30 miles north of Dayton, Ohio along the Interstate 75 (I-75) corridor. Piqua owns and operates a water utility consisting of a 7 MGD Water Treatment Plant (WTP) supplied by three surface water sources, and a distribution system containing 110 miles of mains, two booster pumping stations, and four elevated storage tanks (2 MG total storage). According to historical and projected demands the average day finished water consumption is approximately 3.5 MGD, with a maximum day of 4.7 MGD.

The Piqua WTP was constructed in 1926 and expanded in 1961. The plant provides lime-soda softening, stabilization, filtration, disinfection, treated water storage and pumping facilities. A Water Treatment Plant Assessment and Master Plan, prepared by Jones & Henry, Ltd. in 2007, stated "Much of the treatment plant equipment is now nearly 50 years old with some over 80 years old and has reached the end of its useful life."

The Ohio EPA advised Piqua of concerns of the water plant's "ability to meet the future requirements of the Stage 2 Disinfectant/Disinfection Byproducts Rule" as early as December 2006. More recently, OEPA issued a directive for Piqua to have a firm plan in place by December 31, 2011 to develop an alternative source of water supply either through a new WTP or a supply from an alternative treatment operation. The development of a new WTP would require a treatment regimen that can address surface water source issues such as atrazine and nutrients, commonly found in surface water sources such as those around Piqua.

The City of Troy, Ohio is located approximately 23 miles north of Dayton, Ohio along the I-75 corridor. Troy owns and operates a water utility consisting of a 16 MGD WTP supplied by an east and west well field with ten wells capable of producing 10.4 MGD, and a distribution system containing 170 miles of mains. The plant includes lime-soda softening, coagulation, sedimentation, filtration, stabilization, disinfection, re-carbonation, treated water storage and pumping facilities. The plant was built in 1971 as an 8 MGD facility and expanded in 1996-1999 to its current 16 MGD capacity. The average day demand in the Troy distribution system is 4.1 MGD with a recent historic maximum day of 5.5 MGD.

In the Troy 2010 Sanitary Survey Evaluation Report conducted by the OEPA, the report indicated that all areas were "Acceptable" and "no deficiencies were noted with water treatment." Included as Appendix B is a copy of Troy's 2010 Ohio EPA Sanitary Survey.

City	Water Treatment Plant Capacity	Average Day Demand	Maximum Day Demand
Piqua	7 MGD *	3.5 MGD	4.7 MGD
Troy	16 MGD **	4.1 MGD	5.5 MGD
	Total	**7.6 MGD**	**10.2 MGD**

* MGD - Million gallons of water per day

** While Troy's treatment plant is rated for 16MGD, its well fields are currently rated at 10.4 MGD

2.2 Operational Options

The cities of Piqua and Troy have discussed operational options of both of their respective water utilities on and off for at least five years. Piqua's concerns center on meeting future water quality regulations and the cost of rehabilitating or replacing their aging WTP, which according to the OEPA is not capable of meeting current and future regulatory requirements. Troy is concerned about continued operation of a WTP which is running at 25% of its rated capacity. They understand the need to spread the high fixed cost of operating their plant over a larger customer base.

Reports on the operations of both systems have been commissioned and generated by engineering consultants including, Jones & Henry, Black & Veatch (BV), and Camp Dresser and McKee (CDM). Several White Papers were also authored by staff members of both communities in an attempt to capture the key points and costs included in the engineering reports, and tie those costs back to pro forma budgets that projected rate impacts associated with various operational strategies.

Consideration of the engineering reports and the white papers, and interviews with water utility personnel from each community narrow the options to two feasible alternatives: 1) Piqua builds a new surface water treatment plant, or 2) Piqua and Troy work toward a joint water supply arrangement with the Troy WTP providing finished water to both communities. A third alternative of rehabilitating the existing Piqua WTP received some review, but was discounted early on when it was decided that this option only extended the life of an "old" plant.

2.3 Water Supply from Troy

The Troy WTP came on line in 1971 as an 8 MGD facility and was later expanded in 1999 to a 16 MGD facility. That means parts of the plant are 40 years old and other parts are only 12 years old. Based upon a site inspection of the plant and a review of the 2010 OEPA Sanitary Survey Evaluation Report for the Troy water system, the plant is in very good condition, capable of meeting current and future regulations. Regularly planned equipment upgrades and replacements over the plant's history have kept the plant running smoothly and have extended its useful life. This is an important point when comparing the two operational options. A forty

year old "marginal" condition plant would not compare well against a new WTP option. However just as a well maintained home can last well beyond a hundred years, a well maintained treatment plant, such as Troy's, can function over 100 years. To maintain the Troy WTP in good condition, normal upgrades and improvements have been consistently made and continue to be planned. Paragraph 2.5 below discusses the future improvements needed to keep the Troy WTP performing in an optimal manner.

2.4 Capital Investment for Supply from Troy WTP to Piqua

A review of the previous engineering studies mentioned above revealed that the concepts and cost estimates presented in the Black & Veatch report entitled "Evaluation of System Improvements for Water Service to Piqua" dated March 2011 were current, and relevant to this feasibility and cost study. Cost estimates offered by BV are conservative, erring on the high side of expected construction costs when a cost range could be expected. A map of the proposed improvements is presented in Appendix C.

2.4.1 City of Troy Well Field

With the Troy WTP capable of producing 16 MGD and the average day demands of the Piqua and Troy systems totaling 7.6 MGD, there is more than adequate source supply available to meet both current systems requirements. However, the Troy well field limit of 10.4 MGD reduces the margin of excess capacity especially when considering the combined maximum day demands of 10.2 MGD. Piqua is looking for a 6.75 MGD source supply. Given Troy's historic maximum day of 5.5 MDG, an expansion of the well field sometime in the future to a rated 16 MGD capacity would be prudent. To that end, Troy conducted exploratory test drillings at five locations to the southeast of the existing East Well Field on property owned by the Miami Conservancy District (MCD), and on agricultural property to the east of the WTP. It was determined that three additional wells, each rated between 2-3 MGD, could be sited at three of the five tested locations offering an additional firm source of 5 MGD of supply, achieving the increased capacity of 16 MGD.

Rated capacity is defined by the Ohio EPA as the total production capacity of all the wells with the largest producing well out of service

A Source Water Assessment and Protection Program (SWAP) Update was commissioned by Troy and completed in August 2010 by Malcolm Pirnie. The SWAP was developed to support plan approval for potential production wells at three of the five test hole sites. The report discusses groundwater flow model development, along with particle tracking, and a sensitivity analysis of the impact of model input parameters on the size and shape of the five-year, and one-year time-of-travel zones. A Potential Contaminant Source Inventory (PCS) was conducted to identify any activity or land use that has the potential to contaminate Troy's production

wells. The PCS also provides an initial screening of the relative risks associated with each source.

The opinion of probable construction costs[1] of well field improvements to increase Troy's source water supply to 16 MGD as follows:

Vertical wells[2]	$ 400,000
Raw Water Piping Additions	$ 115,000

[1] Based on current market value and formulated from supplier estimates and past project experience.
[2] One new well included at this time and the second well as needed. Raw water piping installed with first well.

On October 19, 2011, the USEPA and the OEPA jointly hosted an information meeting in Troy to provide an update on the investigation of chemical pollution impacting Troy's aquifer. The joint study is referred to as the "*East Troy Contaminated Aquifer Investigation."* The East Troy site is an area where volatile organic compounds, including the common industrial chemicals PCE and TCE, have contaminated ground water, soil and the indoor air in basements.

Because the Troy well field is the raw water source for the option of the Troy WTP providing finished water to both Piqua and Troy, the long-term viability of the well field became a focal point for continuing to explore the joint venture. To address this concern a hydrogeology specialty firm, Eagon & Associates, was engaged to study the information pertaining to the well field and provide a White Paper Assessment of the safety and viability of the well field. The white paper concluded "*that there is no plausible scenario whereby the aquifer becomes unusable from the standpoint of water quality."* The Assessment is included in this report as Appendix D.

2.4.2 Troy Water Treatment Plant Improvements

In order to connect the Troy WTP to the Piqua distribution system, a minor upgrade to the WTP's existing 13-ton carbon dioxide storage tank would be required. A new 26-ton tank would be required to meet the OEPA 30-day storage requirement for the increased average plant flow. BV estimated that cost at:

Carbon Dioxide Storage Tank	$ 215,000

2.4.3 Transmission and Distribution Improvements

To more fully understand and design an "optimal" transmission system to convey finished water from the Troy WTP to the heart of the Piqua distribution system, a system hydraulic model combining both systems is required. The BV study referenced earlier in this Section, updated the hydraulic model of Troy's distribution system, but did not take into account Piqua's

system. Piqua has contracted CDM to produce a Distribution Master Plan that is being developed concurrently with this report and will be available in early 2012. Depending on the detail of the individual community models the cost to provide a combined model could be less than $50,000.

Creating a combined hydraulic model is not in the scope of this study; therefore the arrangement of interconnection piping, booster pumping station and storage is based on the BV report, with additional analysis provided through meetings with the respective Piqua and Troy water utility staffs. Again, creating a delivery system without having a combined system hydraulic model is not an optimal approach, but the available information provides a reasonable basis for developing an infrastructure facility plan that will yield costs for a comparative analysis.

Several parameters are important when configuring the transmission and distribution improvements required for linking Piqua to the Troy WTP. They are:

1) The transmission system must be capable of conveying 6.75 MGD of flow to Piqua under all conditions, while maintaining an adequate water supply to Troy's customers.
2) Interconnections between the new transmission piping to Piqua and Troy's existing distribution system are desirable to ensure a reliable Troy system that can provide a redundant feed.
3) Redundant supply mains from Troy to Piqua are desirable to reduce the risk of "no water" during an interruption of supply.
4) Piping improvements should be carried far enough into Piqua's distribution system to connect to the transmission spine that supplies water from the existing Piqua WTP.
5) Boosting of the pressure from the transmission system should be planned to match the current and future pressure gradient in Piqua's Central Service pressure zone.
6) Storage should be available to allow for operation flexibility and to provide a buffer capacity during an interruption of supply. This storage can also serve as an infusion point for additional chemical treatment such as re-chlorination, fluoridation, and pH adjustment, if necessary.

For a 6 MGD supply, the Black & Veatch hydraulic model recommended a 20-inch transmission piping system to run from the Troy WTP to an interconnect point south of the Piqua city limits (Farrington Road @ North County Road (CR) 25A). Features such as dual Great Miami River crossings, an interconnection to the current Troy transmission main near Atlantic Street, and tunnel crossings of CR 25A and the I-75 ramps at the CR 25A interchange were included. A 12-inch transmission main would connect to the existing 12-inch distribution main along Experimental Farm Road at Eldean Road and extend north to the interconnect point at Farrington Road to provide partial redundancy.

At the December 8, 2011, Workshop #2 held in Piqua to present preliminary study findings to the Piqua/Troy steering committee, Piqua informed the RA team that the proposed Piqua WTP was now being planned as a 6.75 MGD facility, expandable to 9 MGD, rather than the 6 MGD plant originally envisioned. To accommodate the larger plant design with a supply from Troy, it is now recommended that the transmission pipeline from Troy be increased to a 24-inch main.

Black & Veatch envisioned a 0.5 MG elevated storage tank and a firm 6 MGD (now 6.75 MGD) booster pumping station at the Farrington Road interconnect. The boosted pressure at the pumping station will be set to accommodate the current pressure gradient in the Piqua Central Service district, or a pressure gradient established by a new elevated tank planned by Piqua. A chemical feed system would be housed at the booster pumping station for chlorination and fluoridation. A backup power supply in the form of a 350 KW diesel powered engine-generator was also included.

Line items costs for these improvements are presented below:

24-inch Transmission Main	$ 4,468,000[3]
2 - 20-inch River Crossings	$ 432,000
12-inch Transmission Main	$ 1,102,000
0.5 MG Elevated Tank	$ 1,100,000
Booster Pumping Station	$ 840,000
Standby Generator	$ 179,000
Chemical Feed Systems	$ 269,000
Total for Transmission Main, Receiving Tank & Booster Pumping Station	$ 8,390,000

[3] *Based on normal cut & cover installation, minimal rock encountered*

To comply with the six parameters identified for linking the two systems, redundant transmission piping is required from the Farrington Road interconnect point to the Piqua Central Service system. A combination of one 24-inch water main and one 16-inch water main would be constructed from Farrington Road Booster Pumping Station. The 24-inch main would follow North CR 25A into Piqua's Central Service system, approximately 16,450 feet, and connect to an existing 16-inch main at the intersection of Greene and Spring Streets. This transmission main would pass by a potential site for a new elevated storage tank for the Central Service pressure zone on the south side of Hemm Road near North CR 25A. The second 16-inch booster station discharge line would also follow CR 25A north to Hemm Road and then head west along Hemm Rd to Drake Road, continuing north along Drake Road to an existing 16-inch main in the Piqua Central Service system at Gordon Road, for a distance of 13,150 feet. The opinion of probable construction costs for these improvements is as follows:

16,450 L.F. 24-inch Transmission WM	$ 2,715,000[3]
13,150 L.F. 16-inch Transmission Costs	$ 1,942,000[3]
Total Costs	$ 4,657,000

[3] *Based on normal cut & cover installation, occasional rock encountered*

The opinion of probable construction costs of these combined improvements required to bring a water supply source from the Troy WTP to the heart of the Piqua Central Service district, as presented above, totals $13,637,000. A 10% contingency plus an engineering fee of 15% brings the total project costs to $17,000,000. This value represents a "worst case" estimate of cost to construct a fully redundant 6.75 MGD supply of water from the Troy WTP to the Piqua distribution system. Potential alternative approaches will be discussed in the following section.

2.4.4 Transmission and Distribution Improvement Alternatives

Supply alternatives may be available that would produce an optimal delivery system at reduced costs through the development of a combined system hydraulic model. For instance, a direct water line from the Troy WTP to a new 2 MG elevated storage tank in Piqua's Central Service district could result in an estimated $2,500,000 savings over the plan presented above, while at the same time offsetting future capital costs by Piqua for a new elevated storage tank. Total potential savings to the community could be between $4 and $5 million. Such a plan would create a risk of service interruption risk by relying on a single transmission main, but that risk could be offset by having a total of 4 MG of elevated storage (~ 24-hour AD supply) available to meet average demands while maintenance or repairs to the transmission main were being addressed.

Another alternative, while still assuming risk, but on a lesser scale, is replace the 0.5 MG elevated storage tank at the Farrington Road Booster Pumping Station with a 2 MG ground storage tank. This approach could eliminate the need for the 12-inch backup line from Troy and replace its function with additional storage close to Piqua. This approach could result in a net cost reduction of approximately $ 1,000,000.

More alternative cost-effective solutions representing even less risk can be explored with additional hydraulic modeling.

2.5 Future Capital Investment in Troy WTP

An accurate representation of supply from the Troy WTP to Piqua necessitates a look at the future maintenance costs associated with the Troy WTP. A joint utility would include all costs to maintain the existing condition of the Troy WTP. As mentioned earlier in this report, the 2010 OEPA Sanitary Survey Evaluation noted "no deficiencies were noted with water treatment" and also "the City of Troy treatment plant was very clean, orderly, well operated

and managed." Continuing diligent maintenance procedures for the foreseeable future will be vital for a successful joint venture.

The treatment process in the plant goes through the following stages: Groundwater/Wells → Clarification (Lime – Soda Ash addition) → Re-carbonation → Chlorination → Filtration → Clear Wells → Pumps/Distribution. The table displayed below represents the maintenance schedule for each stage of the process:

Stage	Description	Yearly Maintenance Cost	30 Year Cost
Groundwater/Wells	10 Existing Wells, 5 West & 5 East (2 Additional Proposed Wells)	2 Wells Serviced Per Yr @ $42, 000	$1,260,000
Clarification (Lime-Soda Ash Addition)	4 Clarifiers (2 built in 1971, 2 built in 1997) Serviced by 2 Trains (2 Clarifiers/Train) 4 Slakers (2 Built in 1988, 2 Built in 1997) 2 Lagoons for Lime (12,000 yd^3 each)	Blast & Re-Coat 2 Clarifier Basins Every 20 Years @ Cost of $330,000 Corrosion Control On Trains @ $15,000 Per Year New Turbine Motors Over Next 30 Years @ $7,000 per Train Maintenance & Upgrades to Slakers (Stripped Every 500,000 lbs of Lime) @ $5,000 Per Year Lime Disposal @ $171,000 Per Year ($100,000 Per 7 months)	$660,000 $450,000 $14,000 $150,000 $5,100,000
Re-carbonation	New 26 Ton Tank (Mentioned in Report)	One Time Cost of $215,000 ($100,000 if purchased used)	$215, 000
Chlorination	3 Feeders, No Significant Replacement Necessary	Potential Regulation By Homeland Security Could Present Future Costs (Onsite Generation or Sodium Hypochlorite)	($450,000)

Filtration	8 Filters @ 2 MGD/Filter Media Replaced in 1998	One Time Media Replacement in 30 Years	$300,000
Clear Wells	4 MG Clear Well	Reseal & Coat Every 12 Years @ $22, 000 Well Inspections @ $4500 per 10 Years	$55,000 $13,500
High Service Pumps/Distribution	10 Pumps: 2-800 gpm (50 hp) 2-1400 gpm (100 hp) 4-1,550 gpm (125 hp) 2 (w/VFD)-1750 gpm (150 hp)	Install New VFD's and Fix Hertz Levels on 7 remaining pumps @ $25,000 Per Year Pump Maintenance and upgrades on 1 pump per year @ $20,000	$175,000 $600,000
Building Maintenance	General Facility Maintenance (Concrete, Windows, Roof, etc.)	$18,000 Per Year	$540,000
Instrumentation	General Upgrades & Maintenance to Instrumentation	$15,000 Per Year	$450,000
Electrical Plant	General and Substation Maintenance 3 Emergency Generators for Well Fields and WTP	$7,000 Per Year Maintenance and repairs @ $4,500 Per Year	$210, 000 $135,000

NOTE: All figures and estimates above are based upon a joint venture.

Based on the preceding table the additional costs of plant upgrades and maintenance of the Troy Water Treatment Plant over the course of the next 30 years could amount to approximately $10,357,500. This cost should be considered in order to maintain a serviceable future for the benefit of both communities. It should also be noted that the cost of maintenance must also be considered over a 30-year duration for a new plant built by Piqua. Many of the maintenance costs outlined above would also be incurred by a new treatment plant over its initial 30 years of operation. Many of the costs captured above are representative of similar cost for the new Piqua WTP, but scaled down by virtue of the fact that the new plant is smaller.

2.6 New Water Treatment Plant in Piqua

The City of Piqua has been investigating and planning for the construction of a new WTP plant for several years. Their engineering consultant of record for this project is Camp Dresser McKee (CDM). The original plant design was for a 6 MGD facility but during the period of this study the plant size was increased to a 6.75 MGD facility, expandable to 9 MGD.

CDM conducted ground water investigations in the vicinity of the proposed WTP location but found that the ground water supply was not adequate to meet demand, so surface water with a potential ground water supplement was accepted as the source of supply. Upon revising the approach and reviewing preliminary plans with the OEPA in early December 2011, CDM was able to produce an opinion of probable construction costs for a Single Stage Coagulation/Lime Softening and Post-Filter GAC Contactors New Water Treatment Plant shown below. The proposed plant design takes into consideration the known and potential contaminants in the recommended surface water supply.

Description	Costs
WTP	
Site Work	$ 2,720,000
Onsite Filter Backwash Facility	$ 330,000
Yard Piping	$ 720,000
Chemical Building	$ 3,600,000
Flocculation Basins	$ 900,000
Sedimentation Basins	$ 1,890,000
Re-carb Basins	$ 520,000
Filter/Admin/Pump/GAC Building	$ 7,870,000
Clearwells	$ 2,340,000
Subtotal	**$ 20,890,000**
Contingencies & Engineering	$ 5,370,000
Project Total	**$ 26,260,000**
Offsite Work	
Raw Water PS	$ 1,010,000
Gravel Quarry PS Improvements	$ 280,000
24” Raw Water Piping	$ 1,170,000
12” Gravel Quarry Raw Water Piping	$ 100,000
24” Finished Water Piping	$ 1,250,000
6” Sludge	$ 190,000
Subtotal	**$ 4,000,000**

Contingencies & Engineering	$ 1,365,000
Project Total	**$ 5,370,000**
Overall Project Costs	**$ 31,630,000**

NOTE: CDM Projected Costs are supplied in Appendix E

No costs have been included in CDM's estimate above for a supplemental ground water source. If this approach were to be implemented, it is estimated that an additional $2.5 - $3 million of well field development, pumping and piping cost should be added to the surface water only option shown above. It is expected that the wells would be developed only if an economic justification is made that the added cost of the well field, etc will be offset by savings in O&M cost such as chemicals, GAC replacement, sludge disposal costs, etc.

2.7 Conclusions

Considerable engineering study and analysis has taken place over the past five years concerning the finished water needs, and how to fulfill those needs, for the communities of Troy and Piqua. Both communities have operated their water systems autonomously throughout the history of their existence. Each has met the daily needs of their communities providing a safe and reliable source of potable water. It now falls to the communities to determine whether continuing their autonomy, or joining together, will best serve their rate payers in the future.

In this section, plans for implementing a joint water system using Troy's WTP as a source of supply, and for the development of a new WTP in Piqua were examined. Combining the two community water systems into a joint operation will require capital investments to construct transmission water mains between the two communities along with booster pumping, water storage, chemical feeds, and various other related improvements. The total investment to join the two systems is estimated at $17,000,000. Implementing a new WTP in Piqua will require the siting and construction of the new plant, connecting to and delivering raw surface water to the plant, and commissioning the plant into operation. The total investment to build a new WTP in Piqua is estimated at $31, 630,000. Long-term maintenance and renewal costs will pertain to both.

The concepts and costs presented above represent the ideas and estimates of several engineering firms, past and present. Costs have been presented in 2011-2012 present value. No attempt has been made in this section of the report to inflate costs to future implementation time frames.

3.0 Governance of a Joint Water Treatment and Supply Operation

A Joint Water Treatment and Supply Operation will require bilateral governance of the utility. The cities of Piqua and Troy asked for a conceptual model of a possible governance structure as part of this feasibility study. Below, the elements and practices expected from such a governing structure are outlined.

3.1 Key Desired Elements/Critical Requirements

In order to identify an optimum governance structure for a joint water treatment and water supply operation, a series of workshops were conducted with representatives from both Piqua and Troy. From Piqua individuals from the City Manager's office, the Finance Department, and the Public Utilities and Law Department participated. From Troy representatives from the City Director's Office, City Auditor, WTP Superintendent, City Engineer, and Law Director participated in the workshop.

The first workshop on October 5, 2011 focused on key desired elements each community preferred to see in an optimal governance structure. A briefing session was conducted to identify how the current water utility operations were structured, followed by a brainstorming session to identify key elements. To help facilitate the discussion, a series of questions were posed to the group. Some of the questions are listed below.

1) What critical elements would need to be included to achieve desired outcomes?
2) What would ratepayers, elected officials, city administration, and employees each consider key requirements that would need to be included in an optimal solution?
3) How are the utilities governed today?
4) Are there any specific city charter provisions that need to be addressed?
5) What policies and procedures guide current operations of the water utilities?
    - Hiring, civil service policies
    - Union contracts
    - Pension participation requirements
    - Payments in lieu of taxes
6) What services do the utilities receive from the cities?
7) What services do the cities receive from the utilities?
8) What services would a "joint venture" operation provide and what services would stay with Piqua and Troy? (i.e. treatment operations, lab services)
9) What assets might transfer to a joint operation?

From the discussion the following outline of key elements were developed.

Employees

1) No layoffs of existing employees

2) Employees stay public employees
3) Employees maintain public pensions, benefits, pay

Joint Operations

1) Independent board authority on wholesale rates
2) Equal equity status (assets and costs)
3) Ability to contract services by the independent authority to either city
4) Each city would maintain its own distribution system
5) Each city would maintain system operating licenses and system operators
6) Independent joint authority/board setting of water supply rates

Rates

1) Piqua expecting 30-40% overall increase in rate to implement solution. Desirable option would significantly lessen the impact on rates
2) Joint solution would have to meet or beat current financial assumptions for each city
3) Each community would continue to set rates for their customers

Overall Governance Factors

1) Each community maintains annexation control for their community
2) Piqua and Troy control who participates in joint authority
3) Troy can continue to fulfill West Milton and Miami County contracts
4) Piqua can continue to fulfill service agreement to county properties
5) Provides Troy neutral or reduced 20 year overall cost
6) Provides Piqua neutral or reduced 20 year overall cost
7) Piqua/Troy have control over creation, governance authority, structure of entity
8) Each community has equal appointments to governing board
9) Creation of entity can be done expeditiously
10) Entity can issue debt for the benefit of its operations
11) Each community can independently set rates for residents and businesses within their community
12) Each community has control over destiny within their community

3.2 Options considered for Governance Model

Ohio law provides a number of structure and governance options to facilitate regional partnerships for water and wastewater utilities. In consideration of the critical requirements for joint operation as mentioned above, there were three new governance models presented and discussed at the November 15, 2011 workshop held in Troy, as well as consideration for a bulk (wholesale) water sale agreement option.

3.2.1 Bulk Water Sale

Prior to this study, Troy had proposed to enter into a bulk water sale agreement to supply Piqua with an adequate supply of treated water. The latest proposal, dated May 4, 2009, had guaranteed Piqua 5 MGD, payment based on tiered Troy City rates, with a 25% discount on the lowest rate (Tier 5). As Troy adjusted rates for its own customers, Piqua rates would adjust equally. The proposal would prohibit Piqua from charging their customers a rate less than Troy customers. Piqua would be required to pay for initial connections that would only benefit Piqua, and both cities would pay a proportionate share for other connections. Troy had proposed an initial contract term of 50 years with automatic 10 year renewals.

3.2.2 Create a Water District (Ohio Revised Code Chapter 6119)

A Water District created under ORC 6119 is an independent political subdivision of the State of Ohio, its sole purpose to provide water, sanitary, or storm sewer services. It is a public agency operated by public employees and governed by State Civil Service rules. The Water District would be governed by state law as well as Ohio and US EPA regulations. All revenues generated by the Water District would be retained by the utility.

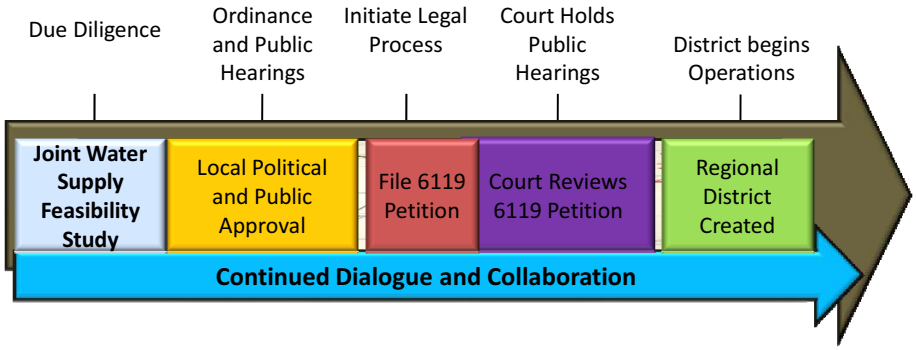
Similar to municipally owned utilities, a joint Piqua/Troy Water District could issue bonds and incur debt, retain employees, exercise eminent domain, and use tax liens for collection of debt. It would be property and income tax exempt and would not be subject to PUCO regulations. The major difference between a municipally-owned water utility, like Troy and Piqua, and a regional water district lies in its governance. While Piqua and Troy water utilities are currently governed by the City Councils of each City, under a regional water district model they would be governed by a separate independent Board of Trustees.

The process for creating a regional water district in Ohio is thorough and transparent, with built in processes for public input. It is initiated by a petition to the County Court of Common Pleas. In this case, there would be a petition jointly authorized by the City Councils of both Piqua and Troy. The petition is a legal document asking that a regional district be formed. Prior to filing the petition, the cities are required to hold a joint public meeting for the purpose of receiving comment on the establishment of the proposed water district. The Court then would review the petition and initiate proceedings which also include public hearings, before issuing a preliminary order declaring the district organized for the purpose of forming a board and filing a plan of operations for the new district. Once the operations plan is filed and reviewed, the Court will then schedule a final hearing to hear any objections to the creation of the district. Objections may be filed by any person or political subdivision residing or lying within the area affected by the water district. The Court will then make a final ruling as to the establishment of the district, its main determination being whether it would be conducive to the public health,

safety, convenience and welfare of the community, and whether it is economically feasible, fair and reasonable.

While the time to create a water district varies, depending upon challenges that could be raised to the petition, it's estimated that it would take 15-21 months to create and commence operations of the new water district for Troy and Piqua. Additionally there is the potential that additional surrounding jurisdictions other than Troy and Piqua could petition the court to become members of the regional water district, either at the initial creation or anytime in the future.

Regional District Creation Process



There are many examples of regional 6119 water/sewer districts in the State of Ohio. Among them are the Southwest Regional Water District, Rural Lorain County Water Authority, Northwestern Water and Sewer District, and Northeast Ohio Regional Sewer District. It's expected that this trend in the water industry to form partnerships to jointly own and manage water resources more effectively and efficiently will continue to grow nationally and within the State of Ohio.

3.2.3 Enter into a Joint Venture Contract Agreement

Ohio Revised Code 715.02 authorizes the creation of a joint water supply entity. The cities of Troy and Piqua would enter into an agreement that would identify the percentage of share or ownership in the new entity, the distribution of assets and compensation terms, and the specific plan for governance of the joint utility such as Board appointment process, authority of the Board, size, terms, qualifications, etc.

The Joint Venture could be financed through bonds issued by the individual cities, the Ohio Development Water Authority, or cash contributions of the cities. Cost sharing would be determined and codified in the joint venture contract agreement. Troy and Piqua would be the

only two government agencies involved in creation of the joint venture, so would have ultimate control over the creation and operation of the new entity. Unlike the Water District process that contains prescribed steps and schedule, the timeline for completing a JV is totally controlled by the two communities. It's realistic that a joint venture could be negotiated and an agreement completed within half the time, so potentially within seven to ten months. To expedite joint services to the communities, they could agree to proceed with engineering and design work while simultaneously completing the intergovernmental agreement. The neighboring communities of Vandalia and Tipp City provide an excellent model for this type of partnership, having established a joint venture in 2002, establishing the Northern Area Water Authority to serve the water treatment and supply needs of their communities.

3.2.4 Create an Independent Non-profit entity 501 (c) (3) corporation to own and operate the joint water utility

The cities of Piqua and Troy could form an independent nonprofit (not a governmental entity). As such, it would not be subject to open meetings, public records law, or public bidding requirements. A Board of Directors would provide governance, with a minimum three member board required.

The non-profit entity would enter into a contract with the cities of Piqua and Troy in order to transfer assets and delineate compensation. The new entity could secure bond financing on its own, but would not be eligible for state or local government grants or loans. It would possess independent authority to enter into contracts and secure financing. Cost sharing for water supply and services provided would be determined by the entity's Board of Directors.

The option of bulk water sale along with the options for governance and operation of a new Piqua/Troy joint water supply authority were compared and discussed based on the key elements and critical requirements that had previously been agreed upon by the team. A chart comparing the options is shown below:

Piqua/Troy Joint Water Supply Authority				
Options for Governance and Operations				
	Bulk Sale	Water District	Joint Venture	Non-Profit
Key Elements Identified for Comparison				
Existing Employees of Piqua and Troy				
No layoffs of existing employees	X	X	X	X
Employees stay public employees	X	X	X	X
Employees maintain public pensions, benefits, pay	X	X	X	X
Operation of Facilities				
Independent joint authority/board operations oversight		X	X	X
Independent joint authority/board setting of water supply rates		X	X	X
Co-ownership of treatment/supply assets			X	
Each community independently owns and operates their respective distribution systems.	X	X	X	X
Provides opportunity for common lab serving both communities		X	X	X
Allows option for Troy to continue to operate treatment plant	X	X	X	x
Overall Governance Factors				
Each community maintains annexation control for their community	X	X	X	X
Piqua and Troy control who participates in joint authority			X	
Troy can continue to fulfill West Milton and Miami County contracts	X	X	X	X
Piqua can continue to fulfill service agreement to county properties	X	X	X	X
Piqua/Troy have control over creation, governance authority, structure of entity		X (initially)	X	X (initially)
Each community has equal appointments to governing board				
Creation can be done expeditiously	X		X	X
Entity can issue debt for the benefit of its operations		X	X	X
Each community can independently set rates for residents and businesses within their community.	X	X	X	X
Each community has control over destiny within their community	X	X	X	X

In a comparison of options, the Joint Venture model aligned with each of the Key Elements/Critical Requirements that the team had established. Most importantly, creation of a joint venture would provide for co-ownership of water treatment and supply assets, and the cities of Troy and Piqua would jointly retain total control in deciding who could participate in the venture, as well as control the timeline for creating it. The consultants agreed to perform a more in-depth case study of the Vandalia-Tipp City joint venture (NAWA) as well as others, and report back to the team at the December 8, 2011 workshop.

3.3 Case Study - Tipp City - Vandalia Joint Venture Agreement Model (Northern Area Water Authority - NAWA)

This case study was presented at the December 8, 2011 workshop in Piqua, followed by team site visit to NAWA for informal discussions with NAWA staff and Board members. Copies of the Intergovernmental Joint Venture Agreement dated March 1, 2002 that created NAWA have been provided to each city.) In 2002, the cities of Tipp City (Tipp) and Vandalia (V), Ohio executed an intergovernmental agreement as authorized by the Ohio Constitution (Article XVIII)

and the Ohio Revised Code (Section 715.02), creating a joint venture to be known as the Northern Area Water Authority (NAWA) The intent of the agreement was to allow Tipp City and Vandalia to jointly plan, finance, construct, own, and operate a water utility system. NAWA is a 7 MGD nanofiltration water treatment facility, operated as a non-profit solely for the mutual benefit of Tipp City and Vandalia, although it may also provide services to third parties for a profit. Each municipality (Tipp/V) hold a 50% share/ownership in the joint venture and the agreement identifies specific assets that are controlled by NAWA and those that remain with the individual municipalities.

Through the agreement, Tipp City and Vandalia agreed to undertake as joint owners of NAWA, the acquisition, construction, equipping, operation, management, modifications, replacement, rehabilitation, retirement or decommissioning of all or a portion of the utility's facilities, including any related planning or engineering studies, the financing costs of NAWA facilities, and to pay or incur the associated costs. In order to provide their respective shares of the facilities costs, the municipalities can pursue joint financing options such as loans through the Ohio Water Development Authority, or individually issue bonds or contribute cash. As costs are incurred by NAWA, each municipality is invoiced monthly based on its proportional use of the NAWA facilities as well as any contracting or operating arrangements pursuant to the joint venture agreement. NAWA holds the water system operator EPA permit in its name; both Tipp and Vandalia gave up their individual system permit IDs but retain their own separate distribution systems.

All property which constitutes NAWA facilities is 50% owned by each municipality as tenants-in-common in undivided shares. All personal property is held in the name of NAWA on behalf of the municipalities and real property is titled under each municipality as 50% owner. Responsibility for maintenance of specific water lines is described and set forth in the agreement.

NAWA contracts with Vandalia for the provision of fiscal services and contracts with Tipp City for the provision of operations and administrative services, including operations management and other professional and technical services. NAWA itself has no staff; employees remain employed by their respective municipality.

NAWA is governed by a Board of Participants, the officers of which are the Chairman, Vice-Chairman, Secretary, and Treasurer. In even-numbered years, the Chairman is the City Manager of Vandalia and in odd-numbered years the City Manager of Tipp City. The City Manager, who is not currently serving as Chairman, serves as the Vice Chairman. The Finance Director of each respective municipality rotates annually as Treasurer as does the Service Director/Utilities Director for the Secretary position. Additional members may be appointed by the municipalities. Current practice is that the Board appoints a fifth "neutral" member, a public official from a surrounding community.

NAWA Board authority is similar to a City Council; they oversee policies regarding day-to-day operations of the plant, approve purchases over $25,000, approve budgets, and set the wholesale rates that will be charged back to the municipalities. A technical committee comprised of the Utility Directors and Engineers from both cities, as well as the NAWA Water Plant Supervisor meet monthly; this committee staffs and makes recommendations to the NAWA Board.

NAWA enters into contracts on behalf of both municipalities, so each municipality would be named jointly in any legal action that may arise. Disputes arising between the municipalities in connection with the joint venture agreement are subject to negotiation.

NAWA does not incur debt on its own behalf, but the agreement provides the option for NAWA to create a separate non-profit for the purpose of incurring debt. So far, NAWA has not exercised that option. Joint financing has been provided through the Ohio Water Development Authority and the individual municipalities have provided their proportionate share of financing through their own bond issuances or cash contributions.

It's important to note, that much of the operations and management structure of the NAWA agreement is the result of negotiations between the municipalities that are parties to the agreement and do not necessarily reflect legal requirements of joint utility ventures between municipal corporations. Tipp City, Vandalia and Huber Heights jointly own and operate the Tri-Cities North Regional Wastewater Authority (TCA) which was established in 1985 to provide sanitary sewer services for all three communities. Through the team's discussions with staff and Board, we learned that NAWA was significantly structured using the TCA partnership model.

In addition to NAWA and TCA which are joint ventures established for water services, there are several other models for Ohio Joint Ventures established under ORC 715.02:

Diesel Peaking Generation (Omega JV1)

- Cuyahoga Falls, Amherst, Hudson, Niles, Hubbard, and 15 other Ohio municipalities

Natural Gas and Diesel Peaking (Omega (JV2)

- Hamilton, Dover, St. Mary's, Shelby, Painesville, Yellow Springs, and 30 other Ohio communities

Electric Transmission (Omega JV4)

- Bryan, Montpelier, Pioneer, Edgerton

Hydroelectric Generation (Omega JV5)

- Bowling Green, Napoleon, Wadsworth, Oberlin, Cuyahoga Falls, Hudson, Jackson Center, Minster, Versailles, and 31 other Ohio communities

Wind Generation (Omega JV6)

- 10 Ohio communities, including Bowling Green, Cuyahoga Falls, Napoleon, Elmore, and Wadsworth

3.4 Outline of a Possible Governance Structure

At the conclusion of the November 15, 2011 workshop, the representatives of Piqua and Troy determined that the best governance structure for a "Joint Water Treatment and Water Supply Operation" would probably be a joint venture similar to the Northern Area Water Authority created by Tipp City and Vandalia, Ohio. The approach satisfied all of the key elements/critical requirements identified by both Piqua and Troy in the October workshop. Though further review may be necessary, an examination by both the Piqua and Troy legal counsels with the assistance of RA Consulting staff did not uncover any major legal impediments to forming the joint venture.

The purpose of a joint venture (JV) created under Ohio Revised Code 715.02 would be to hold, on behalf of both communities, the treatment plant and interconnection assets needed to treat and supply water to each community. While the actual wells would be owned by the JV, the land around the wells would be leased from Troy. Because many of the wells are in Troy recreation areas, Troy would be responsible for maintaining the land and area around the wells and within the well field.

The joint venture would be responsible for providing a reliable supply of water that meets the daily needs of both communities and meets the local, state, and federal drinking water supply regulations. It would be expected to plan and make the necessary plant and equipment investments to meet the demands of both communities throughout the life of the joint venture agreement. While fulfilling its purpose and mission, the JV would be expected to maintain operating costs at favorable levels for both Piqua and Troy.

The Joint Venture would only be authorized to sell water on a wholesale basis to the cities of Piqua and Troy. The JV could not enter into wholesale supply agreements with other communities without approval of Piqua and Troy. The Joint Venture would not be authorized to sell water on a retail basis to individuals, businesses or other organizations/operations.

The costs of the JV would be allocated to each community based upon the amount of water they were supplied by the treatment and transmission facilities. The JV would also be responsible for meeting water quality regulations at the point of the interconnection meters to each community's distribution system. Meeting water quality regulations within the distribution systems would be the responsibility of each community.

Each community would control and maintain the distribution systems, billing, and management of the water systems within their service area. Consequently each community would set the

retail rates they would charge residents and businesses within their community. They would also be responsible for complying with all local, state, and federal regulations pertaining to their distribution system and utility operations within their service area.

Governance of the Joint Venture would be provided by a Board of individuals appointed by Piqua and Troy. The purpose of the Board would be to set the policies governing the day-to-day operations of the treatment plant and interconnection. The Board would be responsible for seeing that water is supplied to meet each community's daily needs and insure that the water supply meets local, state, and federal regulations. The Board would insure that any assets necessary to fulfill the JV's purpose and mission are constructed. Any easements needed by the JV to construct interconnections or facilities for the JV would be obtained by the community where the land resides, by working with the entity(s) outside of the respective communities, or in the case of unincorporated areas would be acquired by the new JV. The Board would set the capital budget and annual operating budget for the JV, allocate costs to each community by annually setting the wholesale water supply rates, and see to it that sufficient revenues are generated to pay for the JV's capital and operating expenses. The Board would also be responsible for securing financing to meet capital expenditure needs.

The Board would have the authority to contract for the necessary services and supplies needed to meet its obligations. Probably the most efficient arrangement would be for the Board to contract with Troy to operate the plant since Troy employees are familiar with the plant and its equipment. Piqua would provide, through a contract, financial and administrative services including preparing the annual budgets and fulfilling financial reporting and auditing requirements to the state.

Ohio law under ORC 715.02 is not specific as to the makeup of a joint venture governance board. The exact makeup of the board would be subject to further discussions between Piqua and Troy. The following is presented as a basis to begin discussions and is modeled after the Northern Area Water Authority.

The Board could be made up of seven individuals as outlined below.

- Chief administrator of Piqua
- Chief administrator of Troy
- Finance Director of Piqua
- City Auditor of Troy
- Public Utility Director (or similar position) of Piqua
- City Engineer of Troy
- A 7th member from outside the communities selected by the other members of the Board

The Board chairmanship would alternate annually between representatives from each community. The Vice Chair would be a representative from the community not serving as board chair. Treasurer of the Board would alternate annually between the Finance Directors of each community.

The Board would meet no less than every 90 days and could call special meetings as a majority of the Board sees fit. The Board would also have the authority to establish committees of members from the board or outside of the board as it sees fit. One committee would be a technical committee to advise the board on day-to-day operations.

The agreement between Piqua and Troy would remain in place in perpetuity unless the communities agreed to dissolve the joint venture. If a decision is made to dissolve the joint venture, then the joint venture would continue to operate and be governed under the agreement's terms and obligations until such time as each community is able to construct treatment facilities or secure an alternate water supply source sufficient to meet the community's daily needs.

4.0 Business Case Analysis

As noted in the introduction, the third element of the study is the comparison of the cost of a joint water supply operation with the operation of independent water systems. Developing business cases for each of the options provides a comparison that not only includes capital and operating costs, but incorporates timing of revenue adjustments, timing and financing of capital expenditures, and accounts for the impact of inflation. The following analysis is structured as follows:

- Base Case – as is for each community
  - City of Piqua
    - Assumptions
    - Capital Pro Forma
    - Operating Pro Forma
  - City of Troy
    - Assumptions
    - Capital Pro Forma
    - Operating Pro Forma
- Joint Venture impact on each community
  - Assumptions
  - City of Piqua
    - Capital Pro Forma
    - Operating Pro Forma
  - City of Troy
    - Capital Pro Forma
    - Operating Pro Forma

4.1 Base Case

The base case or as-is analysis for each community reviewed the current customer base, rates, and operating and capital budgets. Discussions were held with staff from each community to review basic data and assumptions associated with anticipated changes. Data from reports referenced in Section 2 were incorporated in the analysis. The study period for the business cases is 2013 – 2035.

4.1.1 City of Piqua

Assumptions for the Base Case for the City of Piqua are shown in Table 4.1. The utility served approximately 8,825 customers in 2011, with revenue from user charges totaling just over $3 million. A revenue adjustment of 10% is anticipated to be adopted in the first quarter of 2012.

No growth in customer base is expected through 2013; nominal growth of 0.2% per year thereafter.

Table 4-1 – Assumptions – City of Piqua

Base Case - No Joint Venture - 3.5% Debt

New Capital Costs		
Cost of New Treatment Plant	$ 26,260,000	
Cost of Raw Water Line	$ 5,370,000	
Total	$ 31,630,000	
Capital Spend in 2012	$ (2,200,000)	
Net Capital Cost	$ 29,430,000	
Change in Operating Costs		
Increased Operating costs in 2016	$ 1,789,600	
Cost savings	$ (604,600)	
Net increase in Operating Costs	$ 1,185,000	
Growth in Customer Base		
2013	0.0%	
2014 - 2035	0.2%	annually
Inflation factors		
Operating	3.0%	annually
Capital		
2013 - 2014	2.0%	annually
2015 - 2017	3.0%	annually
2018 - 2035	3.3%	annually
Borrowing Costs		
Interest rate	3.5%	
Term	30	years
Issuance costs	1.0%	
Reserves	no reserves required	

Capital investment is based on the current Capital Investment Plan (CIP) through 2021. An annual placeholder for capital expenditures from 2022 - 2035 has been incorporated into the analysis. Capital costs have been inflated by 2.0% in 2013 to 3.3% in 2035. Capital financing is estimated at 3.5% with a term of 30 years. It is assumed that the type of financing obtained will not require reserves and will cost approximately 1% of the issuance cost.

Operating costs are based on the 2012 budget and incorporate annual inflation of 3%. Additional operating costs of $1,590,000 associated with the new treatment plant are based on estimates provided by CDM. This estimate is based on 2012 dollars. The plant is anticipated to begin operation in 2016; therefore the costs have been adjusted accordingly. Cost savings,

starting in 2016, of approximately 40% of current treatment plant operating costs have also been incorporated into the projections.

The critical time frame for the comparison of the cost of a joint water supply operation with the operation of an independent water system is the first five years. During this time frame, capital dollars are needed and significant changes in operation are recognized. The following Capital and Operating Pro Formas are based on this time frame. However, a long-term analysis of impacts on revenues also provides insight into the viability of the options. Following the discussion on the five-year pro formas is a summary of the impact on revenues through 2035.

A summary of the Capital Pro Forma for the period 2013 – 2017 is shown in Table 4.2. Discussions with City staff and an analysis of 2012 capital spend have estimated a beginning balance available for capital projects of $515,400. Funding for major capital comes from debt financing and cash funding. It is anticipated two debt issuances will be needed in the study period. A $30 million issue in 2013 and a $5 million issue in 2015, combined with $2.5 million in cash funding, will meet the capital needs identified in the CIP. Issuance costs associated with the debt are estimated at $350,000.

Table 4-2 – Five-Year Capital Pro Forma – City of Piqua

Base Case - No Joint Venture - 3.5% Debt

	2013	2014	2015	2016	2017
	$	$	$	$	$
Beginning Balance	515,400	20,769,800	2,542,600	1,110,100	923,800
Source of Funds	**-**	**-**	**-**	**-**	**-**
Debt	30,000,000	-	5,000,000	-	-
Cash Funding	400,000	500,000	800,000	200,000	600,000
Total Source of Funds	30,400,000	500,000	5,800,000	200,000	600,000
Use of Funds	**-**	**-**	**-**	**-**	**-**
CIP	9,845,600	18,727,200	7,182,500	386,300	1,364,200
Issuance Costs	300,000	-	50,000	-	-
Reserve Fund	-	-	-	-	-
Total Use of Funds	10,145,600	18,727,200	7,232,500	386,300	1,364,200
Ending Balance	20,769,800	2,542,600	1,110,100	923,800	159,600

The impact of the capital program and increased operating costs is best demonstrated in the Operating Pro Forma. A summary of that Pro Forma for the period 2013 – 2017 is shown in Table 4.3. Discussions with City staff and an analysis of 2012 operating expenditures have estimated a beginning balance of $880,200. This balance reflects the best practice of

maintaining 90 days of operating expenses as working capital. User charge revenue provides the bulk of the funds needed to operate the system. Total user charge revenue, including revenue adjustments, increase from $4.7 million in 2013 to $7.3 million in 2017. The increased user charge revenue reflects the revenue adjustments shown in Table 4.4.

Table 4-3 – Five Year Operating Pro Forma – City of Piqua

Base Case - No Joint Venture - 3.5% Debt

	2013	2014	2015	2016	2017
	$	$	$	$	$
Beginning Balance	880,200	822,100	858,700	891,800	1,187,600
Revenue	-	-	-	-	-
User Charge Revenue	3,076,300	3,081,700	3,087,200	3,092,500	3,098,500
Revenue from Increase	1,576,600	2,401,200	2,894,200	3,845,000	4,162,300
Total User Charge revenue	4,652,900	5,482,900	5,981,400	6,937,500	7,260,800
Miscellaneous Revenue	75,700	75,700	75,700	75,700	75,700
Interest income	15,300	15,800	16,300	22,700	23,400
Total Revenue	4,743,900	5,574,400	6,073,400	7,035,900	7,359,900
Expenses					
Operation and Maintenance	3,069,500	3,161,600	3,256,500	4,539,200	4,675,400
Cash finance CIP	400,000	500,000	800,000	200,000	600,000
Exising Debt Service					
OWDA 2005	132,800	132,800	66,400	-	-
OWDA 2006	14,400	14,400	7,200	-	-
Proposed Debt Service					
2012 issue	97,900	97,900	97,900	97,900	97,900
2013 issue	1,087,400	1,631,100	1,631,100	1,631,100	1,631,100
2015 issue	-	-	181,200	271,900	271,900
Total Expenses	4,802,000	5,537,800	6,040,300	6,740,100	7,276,300
annual balance	(58,100)	36,600	33,100	295,800	83,600
End of year Balance	822,100	858,700	891,800	1,187,600	1,271,200
Reserves	767,400	790,400	814,100	1,134,800	1,168,900
Debt Service coverage	1.26	1.29	1.42	1.25	1.34

Table 4-4 - Revenue Adjustment – City of Piqua

	Revenue Adjustments	
	Annual	Cumulative
2013	45%	45%
2014	25%	81%
2015	15%	108%
2016	32%	175%
2017	8%	197%

In addition to user charge revenue, miscellaneous revenue and interest income generate from $91,000 in 2013 to $99,100 in 2017.

Expenses consist of operation and maintenance, debt service and cash-financed CIP. As noted in the assumptions table, operation and maintenance costs reflect the new treatment plant costs and anticipated savings. Debt service includes existing Ohio Water Development Authority (OWDA) loans and new debt from a 2012 issue valued at $1.8 million and proposed 2013 and 2015 issuances noted in the Capital Pro Forma.

The annual balance reflects the difference between annual revenue and expenses. This balance is added to the beginning balance to generate the year-end balance. The goal of the analysis is to maintain 90-day operating costs, as shown on the reserves line. Another benchmark for sound financial operation is to review debt service coverage. Coverage is the ratio of revenues less expenses to annual debt service. Although the City does not have covenants requiring them to maintain a certain level, it is best practice to review coverage and try to maintain a certain level. This analysis works towards maintaining 1.25 coverage. Review of the long-term impacts on the revenues is summarized in Table 4.5. As noted in the far right column, the first five years of adjustments match those shown on the pro forma. Increases thereafter are generally consistent between 6% and 8% annually. The level of the increases mainly reflects the difference between the customer growth rate and inflationary impacts on operating and capital costs. Table 4.5 illustrates the impact of the City obtaining 3.5% financing for their capital needs. If the City was able to obtain 2% financing, the revenue adjustments would be impacted. Table 4.6 illustrates the impact of this lower rate of financing. The most significant impact occurs in the first five years with the cumulative revenue adjustment decreasing from 197% to 169%.

Table 4-5 – Business Plan Summary – City of Piqua

Base Case - No Joint Venture - 3.5% Debt

	Capital Funding Plan				Operating Cash Flow					Revenue Adjustment	
	Capital Improvement Plan without WTP and RWL	Water Treatment Plant and Raw Water Line	Debt Issuance	Cash Finance	Revenues under Existing Rates	Revenues from Increase	Operating Costs	Debt Service	Cash Finance Capital	Annual	Cumulative
	$	$	$	$	$	$	$	$	$		
2013	3,668,100	6,177,500	30,000,000	400,000	3,076,300	1,576,600	3,069,500	1,332,500	400,000	45%	45%
2014	1,652,200	17,075,000	-	500,000	3,081,700	2,401,200	3,161,600	1,876,200	500,000	25%	81%
2015	1,005,000	6,177,500	5,000,000	800,000	3,087,200	2,894,200	3,256,500	1,983,800	800,000	15%	108%
2016	386,300		-	200,000	3,092,500	3,845,000	4,539,200	2,000,900	200,000	32%	175%
2017	1,364,200		-	600,000	3,098,500	4,162,300	4,675,400	2,000,900	600,000	8%	197%
2018	998,200		-	850,000	3,103,800	4,417,800	4,815,700	2,000,900	850,000	8%	221%
2019	909,900		-	900,000	3,109,100	4,674,000	4,960,100	2,000,900	900,000	8%	247%
2020	664,200		-	900,000	3,114,400	4,931,300	5,108,700	2,000,900	900,000	8%	274%
2021	1,294,500		-	1,100,000	3,119,700	5,189,300	5,262,000	2,000,900	1,100,000	8%	304%
2022	1,002,900		-	1,000,000	3,125,700	5,392,100	5,419,700	2,000,900	1,000,000	6%	329%
2023	1,036,000		-	1,000,000	3,131,000	5,589,100	5,582,200	2,000,900	1,000,000	6%	354%
2024	1,070,200		-	1,100,000	3,136,300	5,786,400	5,749,900	2,000,900	1,100,000	6%	381%
2025	1,105,500		-	1,100,000	3,141,600	5,984,600	5,922,400	2,000,900	1,100,000	6%	410%
2026	1,142,000		-	1,200,000	3,147,600	6,185,100	6,100,100	2,000,900	1,200,000	6%	441%
2027	1,179,700		-	1,200,000	3,153,200	6,385,400	6,283,000	2,000,900	1,200,000	6%	473%
2028	1,218,600		-	1,200,000	3,158,800	6,585,900	6,471,600	2,000,900	1,200,000	6%	508%
2029	1,258,900		-	1,200,000	3,164,300	6,787,400	6,665,700	2,000,900	1,200,000	6%	544%
2030	1,300,400		-	1,300,000	3,169,900	6,989,800	6,865,700	2,000,900	1,300,000	6%	583%
2031	1,343,300		-	1,350,000	3,176,200	7,194,400	7,071,800	2,000,900	1,350,000	6%	624%
2032	1,387,600		-	1,400,000	3,181,800	7,397,500	7,283,900	2,000,900	1,400,000	6%	667%
2033	1,433,400		-	1,400,000	3,187,600	7,602,800	7,502,300	2,000,900	1,400,000	6%	713%
2034	1,480,700		-	1,500,000	3,193,200	7,632,000	7,727,400	2,000,900	1,500,000	6%	762%
2035	1,529,600		-	1,500,000	3,200,700	7,649,400	7,959,100	2,000,900	1,500,000	6%	814%
Total	29,431,400	29,430,000	35,000,000	23,700,000							

Table 4-6 – Alternative Business Plan Summary – City of Piqua

Base Case - No Joint Venture - 2% Debt

	Capital Funding Plan				Operating Cash Flow				Revenue Adjustment	
	Capital Improvement Plan without WTP and RWL	Water Treatment Plant and Raw Water Line	Debt Issuance	Cash Finance	Revenues under existing Rates	Operating Costs	Debt Service	Cash Finance Capital	Annual	Cumulative
	$	$	$	$	$	$	$	$		
2013	3,668,100	6,177,500	30,000,000	400,000	3,076,300	3,069,500	1,120,600	400,000	40%	40%
2014	1,652,200	17,075,000	-	500,000	3,081,700	3,161,600	1,567,100	500,000	20%	68%
2015	1,005,000	6,177,500	5,000,000	800,000	3,087,200	3,256,500	1,642,300	800,000	10%	85%
2016	386,300		-	200,000	3,092,500	4,539,200	1,643,100	200,000	35%	149%
2017	1,364,200		-	600,000	3,098,500	4,675,400	1,643,100	600,000	8%	169%
2018	998,200		-	850,000	3,103,800	4,815,700	1,643,100	850,000	8%	191%
2019	909,900		-	900,000	3,109,100	4,960,100	1,643,100	900,000	8%	214%
2020	664,200		-	900,000	3,114,400	5,108,700	1,643,100	900,000	8%	239%
2021	1,294,500		-	1,100,000	3,119,700	5,262,000	1,643,100	1,100,000	8%	267%
2022	1,002,900		-	1,000,000	3,125,700	5,419,700	1,643,100	1,000,000	6%	289%
2023	1,036,000		-	1,000,000	3,131,000	5,582,200	1,643,100	1,000,000	6%	312%
2024	1,070,200		-	1,100,000	3,136,300	5,749,900	1,643,100	1,100,000	6%	337%
2025	1,105,500		-	1,100,000	3,141,600	5,922,400	1,643,100	1,100,000	6%	363%
2026	1,142,000		-	1,200,000	3,147,600	6,100,100	1,643,100	1,200,000	6%	391%
2027	1,179,700		-	1,200,000	3,153,200	6,283,000	1,643,100	1,200,000	6%	420%
2028	1,218,600		-	1,200,000	3,158,800	6,471,600	1,643,100	1,200,000	6%	451%
2029	1,258,900		-	1,200,000	3,164,300	6,665,700	1,643,100	1,200,000	6%	484%
2030	1,300,400		-	1,300,000	3,169,900	6,865,700	1,643,100	1,300,000	6%	519%
2031	1,343,300		-	1,350,000	3,176,200	7,071,800	1,643,100	1,350,000	6%	556%
2032	1,387,600		-	1,400,000	3,181,800	7,283,900	1,643,100	1,400,000	6%	596%
2033	1,433,400		-	1,400,000	3,187,600	7,502,300	1,643,100	1,400,000	6%	638%
2034	1,480,700		-	1,500,000	3,193,200	7,727,400	1,643,100	1,500,000	6%	682%
2035	1,529,600		-	1,500,000	3,200,700	7,959,100	1,643,100	1,500,000	6%	729%
Total	29,431,400	29,430,000	35,000,000	23,700,000						

4.1.2 City of Troy

Assumptions for the Base Case for the City of Troy are shown in Table 4.7. The City served approximately 13,000 customers in 2011. Revenue from user charges totaled just over $4 million. No growth in customer base is expected through 2013; growth of 0.5% per year is projected from 2014 through 2016; growth of 1.0% per year is projected 2017 through 2022; and 1.5% per year is projected the remainder of the study period.

Table 4-7 – Assumptions – City of Troy

	Base Case	
Growth in Customer Base		
2013	0.0%	
2014 - 2016	0.5%	annually
2017 - 2022	1.0%	annually
2023 - 2035	1.5%	annually
Inflation factors		
Operating	3.0%	annually
Capital	3.0%	annually

Capital investment is based on the cash funds on hand each year. The City has a double AA bond rating and has access to debt in the event a major need surfaces. Capital expenditures for the first five years of the study is estimated to total $1.5 million. In 2018, existing debt is retired and funds available for capital increase to over $1 million per year.

Operating costs are based on the 2012 budget adjusted for capital and incorporate annual inflation of 3% for the study period.

As stated previously, the critical time frame for the comparison of the cost of a joint water supply operation with the operation of independent water system is the first five years. During this time frame capital dollars are needed and significant changes in operation are recognized. The following Capital and Operating Pro Formas are based on this time frame. However, a long-term analysis of impacts on revenues also provides insight into the viability of the options. Following the discussion on the five-year pro formas is a summary of the impact on revenues through 2035.

A summary of the Capital Pro Forma for the period 2013 – 2017 is shown in Table 4.8. Discussions with City staff indicate a policy of cash financed capital unless a major need is identified. Therefore the Capital Pro Forma illustrates transfer of available operating funds to finance capital investment.

Table 4-8 – Five-Year Capital Pro Forma – City of Troy

	Base Case				
	2013	2014	2015	2016	2017
	$	$	$	$	$
Beginning Balance	-	-	-	-	-
Source of funds	**-**	**-**	**-**	**-**	**-**
Debt	-	-	-	-	-
Cash funding	-	-	200,000	500,000	800,000
Total Source of funds	-	-	200,000	500,000	800,000
Use of Funds	**-**	**-**	**-**	**-**	**-**
CIP	-	-	200,000	500,000	800,000
Total Use of funds	-	-	200,000	500,000	800,000
Ending Balance	-	-	-	-	-

The impact of the capital program and increased operating costs is best demonstrated in the Operating Pro Forma. A summary of that pro forma for the period 2013 – 2017 is shown in Table 4.9. Discussions with City staff estimated a beginning balance of $1,000,000. This balance reflects the best practice of maintaining 90 days of operating expenses as working capital. User charge revenue provides the bulk of the funds needed to operate the system. Total user charge revenue, including revenue adjustments, increase from $4.2 million in 2013 to $5.2 million in 2017. The increased user charge revenue reflects the revenue adjustments shown in Table 4.10.

Table 4-9 – Five-Year Operating Pro Forma – City of Troy

Base Case

	2013	2014	2015	2016	2017
	$	$	$	$	$
Beginning Balance	1,000,000	921,100	988,000	1,017,750	916,550
Revenue					
User Charge Revenue	4,179,000	4,199,900	4,220,900	4,242,000	4,284,400
Revenue from Increase	-	231,000	485,400	742,300	889,100
Total User Charge revenue	4,179,000	4,430,900	4,706,300	4,984,300	5,173,500
Miscellaneous Revenue	350,900	350,900	350,900	350,900	350,900
Total Revenue	4,529,900	4,781,800	5,057,200	5,335,200	5,524,400
Expenses					
Operation and Maintenance	3,652,400	3,762,000	3,874,800	3,991,000	4,110,800
Cash finance CIP	-	-	200,000	500,000	800,000
Exising Debt Service					
1997 Refunded	561,400	559,150	555,900	551,650	556,400
1996 Refunded	395,000	393,750	396,750	393,750	-
Total Expenses	4,608,800	4,714,900	5,027,450	5,436,400	5,467,200
Annual Balance	(78,900)	66,900	29,750	(101,200)	57,200
End of year Balance	921,100	988,000	1,017,750	916,550	973,750
Reserves	913,100	940,500	968,700	997,750	1,027,700
Debt Service Coverage	92%	107%	124%	142%	254%

Table 4-10 – Revenue Adjustment – City of Troy

	Revenue Adjustment	
	Annual	Cumulative
2013	0%	0%
2014	6%	6%
2015	6%	12%
2016	6%	19%
2017	3%	23%

In addition to user charge revenue, miscellaneous revenue generates $350,900 per year.

Expenses consist of operation and maintenance, debt service and cash financed CIP. Operation and maintenance costs are projected to increase from approximately $3.7 million to 4.1 million. Debt service includes payments on 1996 and 1997 refunding issues.

The annual balance reflects the difference between annual revenue and expenses. This balance is added to the beginning balance to generate the year-end balance. The goal of the analysis is to maintain 90 day operating costs, as shown on the reserves line. Another benchmark for sound financial operation is to review debt service coverage. Coverage is the ratio of revenues less expenses to annual debt service. Although the City does not have covenants requiring them to maintain a certain level, it is best practice to review coverage and try to maintain a certain level. This analysis works towards achieving and maintaining 1.25 coverage.

Review of the long-term impacts on the revenues is summarized in Table 4.11. As noted in the far right column, the first five years of adjustments match that shown on the Operating Pro Forma. Increases thereafter are generally nominal and are noted when reserves are not at the 90 day level. The level of the increases mainly reflects the difference between the customer growth rate and inflationary impacts on operating and capital costs.

Table 4-11 – Business Plan Summary – City of Troy

	Base Case								
	Capital Funding Plan		Operating Cash Flow					Revenue Adjustment	
	Capital Improvement Plan	Cash Finance	Revenues under Existing Rates	Revenues from Increases	Operating Costs	Debt Service	Cash Finance Capital	Annual	Cumulative
	$	$	$	$	$	$	$		
2013	-	-	4,179,000	-	3,652,400	956,400	-	0%	0%
2014	-	-	4,199,900	231,000	3,762,000	952,900	-	6%	6%
2015	200,000	200,000	4,220,900	485,400	3,874,800	952,650	200,000	6%	12%
2016	500,000	500,000	4,242,000	742,300	3,991,000	945,400	500,000	6%	19%
2017	800,000	800,000	4,284,400	889,100	4,110,800	556,400	800,000	3%	23%
2018	1,200,000	1,200,000	4,327,300	908,600	4,234,200	-	1,200,000	0%	23%
2019	1,400,000	1,400,000	4,370,500	917,700	4,361,200	-	1,400,000	0%	23%
2020	1,100,000	1,100,000	4,414,200	927,100	4,492,100	-	1,100,000	0%	23%
2021	1,100,000	1,100,000	4,458,400	936,300	4,626,900	-	1,100,000	0%	23%
2022	1,100,000	1,100,000	4,503,000	945,700	4,765,700	-	1,100,000	0%	23%
2023	1,100,000	1,100,000	4,570,500	1,169,200	4,908,700	-	1,100,000	5%	29%
2024	1,100,000	1,100,000	4,639,100	1,291,200	5,055,900	-	1,100,000	2%	31%
2025	1,100,000	1,100,000	4,708,700	1,318,400	5,207,500	-	1,100,000	0%	31%
2026	1,100,000	1,100,000	4,779,300	1,338,400	5,363,700	-	1,100,000	0%	31%
2027	1,100,000	1,100,000	4,851,000	1,447,300	5,524,600	-	1,100,000	2%	34%
2028	1,100,000	1,100,000	4,923,700	1,477,100	5,690,300	-	1,100,000	0%	34%
2029	1,100,000	1,100,000	4,997,600	1,636,900	5,861,100	-	1,100,000	3%	38%
2030	1,100,000	1,100,000	5,072,600	1,767,200	6,037,000	-	1,100,000	2%	41%
2031	1,100,000	1,100,000	5,148,600	1,943,700	6,218,200	-	1,100,000	3%	45%
2032	1,100,000	1,100,000	5,225,900	1,986,000	6,404,800	-	1,100,000	0%	45%
2033	1,100,000	1,100,000	5,304,300	2,112,900	6,597,000	-	1,100,000	2%	48%
2034	1,100,000	1,100,000	5,383,800	2,045,800	6,794,900	-	1,100,000	0%	48%
2035	1,100,000	1,100,000	5,464,600	2,390,700	6,998,700	-	1,100,000	3%	52%
Total	21,700,000	21,700,000							

4.2 Joint Venture

The Joint Venture analysis builds on the base case for each community. Customer growth and inflationary factors are consistent between the base case and JV. The study period for the business cases is 2013 – 2035. The variables include:

- The creation of a Joint Venture
- The sale of the Troy water treatment facilities to the JV
- The buy-in into the capital assets of JV by each community
- The transfer of Troy water treatment plant operating costs to the JV
- The transfer of a portion of Piqua's administrative costs to the JV
- The allocation of the JV costs back to communities based on projected flow

4.2.1 Valuation of Assets

The sale and buy-in of the Troy water treatment plant necessitates valuing the facilities. Assets included in the value are the water treatment facilities plus the well heads. There are a number of methods used to value utility assets. An approach that is based on the value of the assets by examining their cost basis will give a range of values for consideration by the parties of the Joint Venture.

Cost-based approaches focus on the construction cost of the asset being valued. This approach recognizes that the assets are in-use and have used up a portion of their useful life. Depreciation recognizes this element. The three methods used for the valuation of the Troy water treatment facilities are:

- Original Cost Less Depreciation (OCLD)
- Replacement Cost Less Depreciation (RCLD)
- Reproduction Cost Less Depreciation (Reproduction)

Original cost less depreciation represents the actual cost incurred in the original construction of the facility. Although the data is very accurate as it reflects booked assets, it does not recognize the time value of money – in other words it does not provide a value in "today's dollars". Another weakness of this methodology is when assets are depreciated faster than they are consumed. Standard accounting practice assumes that when an asset is fully depreciated on the books it no longer is used and useful. This is true for the original treatment plant built in 1971. It has been fully depreciated and therefore there is no book value for the asset even though it is still working and used and useful. The OCLD of Troy's water treatment plant is approximately $11 million.

Replacement cost less depreciation attempts to address the issue of the time value of money. It takes the booked assets and trends them to today's dollars based on utility engineering construction cost indices from Handy-Whitman. The replacement cost is then depreciated

based on the vintage of the underlying asset to recognize the asset is not in new condition. The weakness of this methodology is that not all Troy's assets have value on the books, therefore there is not a value to trend and the calculation undervalues the total asset. The RCLD of Troy's water treatment facilities is approximately $19 million.

Reproduction cost less depreciation attempts to address the issue of fully depreciated yet used and useful assets. An engineering estimate is developed for construction of a new greenfield treatment facility. That value is then depreciated to recognize that the asset is not in new condition. The weakness of this methodology is that construction of a new system does not recognize that the existing system was built over time and is not as optimized as greenfield construction. It is also difficult to determine an appropriate depreciation factor for the combination of the assets. The reproduction cost of Troy's water treatment facilities is approximately $50 million.

As indicated in the discussion of valuation methodologies, the value can vary significantly. The OCLD is good information, but unrealistically low. Likewise the Reproduction value does not reflect the actual conditions the facilities were built under. For this analysis, we would suggest a value of $30 million as a starting point as a fair representation of the value of the Troy water facilities. The final value will be reflective of the negotiations between Piqua and Troy.

As noted in Section 2.4.3 of this report, improvements needed to join the two systems are estimated to cost $17,000,000. These costs will be the responsibility of the JV and will increase the value of the assets accordingly.

4.2.2 Operating Costs

The Joint Venture will be responsible for the day to day operations of the facilities. This includes the operation and maintenance of the assets and the associated administrative costs. Troy will provide the operation and maintenance support, Piqua the administrative support. Each community will bill the JV for services rendered. The JV will total the operating costs and allocate them back to the communities based on their respective average day demands. For this analysis, operation and maintenance costs are based on Troy's 2012 budget for treatment plus adjustments for increased flow and one additional person. Administrative services are anticipated to be 15 percent of operating costs. Total Joint Venture Operating Costs are shown in Table 4.12.

Table 4-12 – Joint Venture Operating Costs

	2015
	$
City of Troy O&M	2,205,800
Additional Costs	545,500
Additional Personnel	77,400
Total O&M Costs	2,828,700
Adminstrative Costs	424,300
Total Operating Costs	3,253,000

The costs will be allocated to each community based on average day demand. For this analysis, 2013 demands are anticipated to be 3.5 MGD for Piqua and 4.1 MGD for Troy. The demands are adjusted throughout the study period based on the respective growth in each community.

Projected demands for the JV and associated allocation factors are shown in Table 4.13. Allocation of operating costs is shown in Table 4.14.

Table 4-13 – Project Demands for Joint Venture

	Demand - mgd			Distribution	
	Piqua	Troy	Total	Piqua	Troy
2013	3.50	4.10	7.60	46.1%	53.9%
2014	3.51	4.12	7.63	46.0%	54.0%
2015	3.51	4.14	7.66	45.9%	54.1%
2016	3.52	4.16	7.68	45.8%	54.2%
2017	3.53	4.20	7.73	45.6%	54.4%
2018	3.54	4.25	7.78	45.4%	54.6%
2019	3.54	4.29	7.83	45.2%	54.8%
2020	3.55	4.33	7.88	45.0%	55.0%
2021	3.56	4.37	7.93	44.8%	55.2%
2022	3.56	4.42	7.98	44.6%	55.4%
2023	3.57	4.48	8.05	44.3%	55.7%
2024	3.58	4.55	8.13	44.0%	56.0%
2025	3.58	4.62	8.20	43.7%	56.3%
2026	3.59	4.69	8.28	43.4%	56.6%
2027	3.60	4.76	8.36	43.1%	56.9%
2028	3.61	4.83	8.44	42.7%	57.3%
2029	3.61	4.90	8.52	42.4%	57.6%
2030	3.62	4.98	8.60	42.1%	57.9%
2031	3.63	5.05	8.68	41.8%	58.2%
2032	3.64	5.13	8.76	41.5%	58.5%
2033	3.64	5.20	8.85	41.2%	58.8%
2034	3.65	5.28	8.93	40.9%	59.1%
2035	3.66	5.36	9.02	40.6%	59.4%

Table 4-14 – Distribution of Joint Venture Operating Costs

	Projected Operating Costs					Each Communities' Share	
	Troy Operations (a)	Additional Staff (b)	Additional expense (c)	Administrative Costs (d)	Total	Piqua	Troy
	$	$		$	$	$	$
2013	-	-	-	-	-	-	-
2014	-	-	-	-	-	-	-
2015	2,205,800	77,400	545,500	424,300	3,253,000	1,493,300	1,759,700
2016	2,272,000	79,700	561,900	437,000	3,350,600	1,535,600	1,815,000
2017	2,340,200	82,100	578,800	450,100	3,451,200	1,574,900	1,876,300
2018	2,410,400	84,600	596,200	463,600	3,554,800	1,615,100	1,939,700
2019	2,482,700	87,100	614,100	477,500	3,661,400	1,656,400	2,005,000
2020	2,557,200	89,700	632,500	491,800	3,771,200	1,698,600	2,072,600
2021	2,633,900	92,400	651,500	506,600	3,884,400	1,741,900	2,142,500
2022	2,712,900	95,200	671,000	521,800	4,000,900	1,786,300	2,214,600
2023	2,794,300	98,100	691,100	537,500	4,121,000	1,826,800	2,294,200
2024	2,878,100	101,000	711,800	553,600	4,244,500	1,868,100	2,376,400
2025	2,964,400	104,000	733,200	570,200	4,371,800	1,910,200	2,461,600
2026	3,053,300	107,100	755,200	587,300	4,502,900	1,953,200	2,549,700
2027	3,144,900	110,300	777,900	604,900	4,638,000	1,997,200	2,640,800
2028	3,239,200	113,600	801,200	623,000	4,777,000	2,041,900	2,735,100
2029	3,336,400	117,000	825,200	641,700	4,920,300	2,087,700	2,832,600
2030	3,436,500	120,500	850,000	661,000	5,068,000	2,134,400	2,933,600
2031	3,539,600	124,100	875,500	680,800	5,220,000	2,182,000	3,038,000
2032	3,645,800	127,800	901,800	701,200	5,376,600	2,230,700	3,145,900
2033	3,755,200	131,600	928,900	722,200	5,537,900	2,280,300	3,257,600
2034	3,867,900	135,500	956,800	743,900	5,704,100	2,330,900	3,373,200
2035	3,983,900	139,600	985,500	766,200	5,875,200	2,382,600	3,492,600

(a) Based on current operating costs as budgeted by City of Troy
(b) Based on addional staff required for expanded operations
(c) Based on estimate ofof addional costs due to increased production.
(d) Estimated at 15 percent of operating costs.

4.2.3 City of Piqua

The impact of the Joint Venture can be demonstrated by comparing the Capital Pro Forma, the Operating Pro Forma and the Long-term Business Plan for the base case with the JV. Based on the assumptions shown in Table 4.15, pro formas and a business plan were generated for the City of Piqua. Capital and Operating Pro Formas are shown in Tables 4.16 and 4.17, respectively. Participation in the JV will allow Piqua to issue less debt while realizing operational savings associated with the treatment plant and administration. The impact on revenue adjustments is shown in Table 4.18.

Table 4-15 – Assumptions – City of Piqua

Joint Venture - 3.5% Debt

New Capital Costs			
Joint Venture	$ 23,500,000		
Change in Operating Costs			
	2015	2016	
Operating Cost Base Case	$ 3,256,500	$ 4,539,200	
Operating Cost with JV	$ 3,282,300	$ 3,378,300	
Savings	$ (25,800)	$ 1,160,900	
Plus transfer for Admin. Services	$ 424,300	$ 437,000	
Total Savings in Operating Costs	$ 398,500	$ 1,597,900	
Growth in Customer Base			
2013	0.0%		
2014 - 2035	0.2%	annually	
Inflation factors			
Operating	3.0%	annually	
Capital			
2013 - 2014	2.0%	annually	
2015 - 2017	3.0%	annually	
2018 - 2035	3.3%	annually	
Borrowing Costs			
Interest rate	3.5%		
Term	30	years	
Issuance costs	1.0%		
Reserves	no reserves required		

Table 4-16 – Five-Year Capital Pro Forma – City of Piqua

Joint Venture - 3.5% Debt

	2013	2014	2015	2016	2017
	$	$	$	$	$
Beginning Balance	515,400	16,665,300	513,100	608,100	1,221,800
Source of Funds					
Debt	28,200,000	-	-	-	-
Cash funding	400,000	500,000	1,100,000	1,000,000	1,000,000
Total Source of Funds	28,600,000	500,000	1,100,000	1,000,000	1,000,000
Use of Funds					
CIP	12,168,100	16,652,200	1,005,000	386,300	1,464,200
Issuance Costs	282,000	-	-	-	-
Reserve Fund	-	-	-	-	-
Total Use of funds	12,450,100	16,652,200	1,005,000	386,300	1,464,200
Ending Balance	16,665,300	513,100	608,100	1,221,800	757,600

Table 4-17 – Five-Year Operating Pro Forma – City of Piqua

Joint Venture - 3.5% Debt

	2013	2014	2015	2016	2017
	$	$	$	$	$
Beginning Balance	880,200	1,028,300	1,175,600	1,303,300	1,544,600
Revenue					
User Charge Revenue	3,076,300	3,081,700	3,087,200	3,092,500	3,098,500
Revenue from Increase	1,717,600	2,414,100	2,611,200	2,628,700	2,633,800
Total User Charge Revenue	4,793,900	5,495,800	5,698,400	5,721,200	5,732,300
Miscellaneous Revenue	75,700	75,700	75,700	75,700	75,700
Admin Pmt from JV	-	-	424,300	437,000	450,100
Interest Income	15,300	15,800	16,400	16,900	17,400
Total Revenue	4,884,900	5,587,300	6,214,800	6,250,800	6,275,500
Expenses					
Operation and Maintenance	3,069,500	3,161,600	3,282,300	3,378,300	3,472,900
Cash Finance CIP	400,000	500,000	1,100,000	1,000,000	1,000,000
Existing Debt Service					
OWDA 2005	132,800	132,800	66,400	-	-
OWDA 2006	14,400	14,400	7,200	-	-
Proposed Debt Service					
2012 Issue	97,900	97,900	97,900	97,900	97,900
2013 Issue	1,022,200	1,533,300	1,533,300	1,533,300	1,533,300
Total Expenses	4,736,800	5,440,000	6,087,100	6,009,500	6,104,100
Annual Balance	148,100	147,300	127,700	241,300	171,400
End of Year Balance	1,028,300	1,175,600	1,303,300	1,544,600	1,716,000
Reserves	767,375	790,400	820,575	844,575	868,225
Debt Service Coverage	1.43	1.36	1.72	1.76	1.72

Table 4-18 – Revenue Adjustments – City of Piqua

	Revenue Adjustment	
	Annual	Cumulative
2013	50%	50%
2014	20%	80%
2015	5%	89%
2016	0%	89%
2017	0%	89%

Review of the long-term impacts on the revenues is summarized in Table 4.19. As noted in the far right column, the first five years of adjustments match that shown on the Operating Pro Forma. Increases thereafter are generally nominal and are noted when reserves are not at the 90 day level. The level of the increases mainly reflects the difference between the customer growth rate and inflationary impacts on operating and capital costs.

Table 4-19 – Business Plan Summary – City of Piqua

Joint Venture - 3.5% Debt

	Capital Funding Plan				Operating Cash Flow						Revenue Adjustment	
	Capital Improvement Plan	Joint Venture	Debt Issuance	Cash Finance	Revenues under Existing Rates	Revenues from Increases	Payment for Admin Services from Joint Venture	Operating Costs	Debt Service	Cash Finance Capital	Annual	Cumulative
	$	$	$	$	$	$	$	$	$	$		
2013	3,668,100	8,500,000	28,200,000	400,000	3,076,300	1,717,600	-	3,069,500	1,267,300	400,000	50%	50%
2014	1,652,200	15,000,000	-	500,000	3,081,700	2,414,100	-	3,161,600	1,778,400	500,000	20%	80%
2015	1,005,000		-	1,100,000	3,087,200	2,611,200	424,300	3,282,300	1,704,800	1,100,000	5%	89%
2016	386,300		-	1,000,000	3,092,500	2,628,700	437,000	3,378,300	1,631,200	1,000,000	0%	89%
2017	1,464,200		-	1,000,000	3,098,500	2,633,800	450,100	3,472,900	1,631,200	1,000,000	0%	89%
2018	998,200		-	1,000,000	3,103,800	2,638,300	463,600	3,570,000	1,631,200	1,000,000	0%	89%
2019	909,900		-	1,000,000	3,109,100	2,699,800	477,500	3,669,900	1,631,200	1,000,000	2%	93%
2020	664,200		-	1,000,000	3,114,400	2,795,100	491,800	3,772,400	1,631,200	1,000,000	3%	99%
2021	1,294,500		-	1,000,000	3,119,700	2,893,600	506,600	3,877,900	1,631,200	1,000,000	3%	105%
2022	1,002,900		-	1,000,000	3,125,700	2,993,000	521,800	3,986,300	1,631,200	1,000,000	3%	111%
2023	1,036,000		-	1,000,000	3,131,000	3,091,800	537,500	4,092,800	1,631,200	1,000,000	3%	117%
2024	1,070,200		-	1,000,000	3,136,300	3,191,200	553,600	4,202,100	1,631,200	1,000,000	3%	123%
2025	1,105,500		-	1,100,000	3,141,600	3,290,600	570,200	4,314,300	1,631,200	1,100,000	3%	130%
2026	1,142,000		-	1,100,000	3,147,600	3,420,300	587,300	4,429,500	1,631,200	1,100,000	4%	139%
2027	1,179,700		-	1,200,000	3,153,200	3,552,600	604,900	4,547,800	1,631,200	1,200,000	4%	149%
2028	1,218,600		-	1,200,000	3,158,800	3,685,600	623,000	4,669,100	1,631,200	1,200,000	4%	159%
2029	1,258,900		-	1,300,000	3,164,300	3,818,200	641,700	4,793,700	1,631,200	1,300,000	4%	169%
2030	1,300,400		-	1,300,000	3,169,900	3,951,900	661,000	4,921,600	1,631,200	1,300,000	4%	180%
2031	1,343,300		-	1,300,000	3,176,200	4,086,500	680,800	5,052,900	1,631,200	1,300,000	4%	191%
2032	1,387,600		-	1,400,000	3,181,800	4,221,700	701,200	5,187,700	1,631,200	1,400,000	4%	203%
2033	1,433,400		-	1,400,000	3,187,600	4,356,300	722,200	5,326,000	1,631,200	1,400,000	4%	215%
2034	1,480,700		-	1,500,000	3,193,200	4,374,500	743,900	5,467,900	1,631,200	1,500,000	4%	228%
2035	1,529,600		-	1,500,000	3,200,700	4,384,600	766,200	5,613,700	1,631,200	1,500,000	4%	241%
Total	29,531,400	23,500,000	28,200,000	25,300,000								

Table 19 illustrates the impact of the City obtaining 3.5% financing for their capital needs. If the City was able to obtain 2% financing the revenue adjustments would be impacted. Table 4.20 illustrates the impact of this lower rate of financing. The most significant impact occurs in the first five years with the cumulative revenue adjustment decreasing from 89% to 79%. The long-term adjustments are not significantly impacted as the cost of cash financed capital and the inflationary impact on operating costs are the main drivers of the overall adjustments.

Table 4-20 – Alternative Business Plan Summary – City of Piqua

Joint Venture - 2% Debt

	Capital Funding Plan				Operating Cash Flow					Revenue Adjustment	
	Capital Improvement Plan	Joint Venture	Debt Issuance	Cash Finance	Revenues under Existing Rates	Payment for Admin Services from Joint Venture	Operating Costs	Debt Service	Cash Finance Capital	Annual	Cumulative
2013	3,668,100	8,500,000	28,200,000	400,000	3,076,300	-	3,069,500	1,067,000	400,000	45%	45%
2014	1,652,200	15,000,000	-	500,000	3,081,700	-	3,161,600	1,486,700	500,000	11%	61%
2015	1,005,000		-	1,100,000	3,087,200	424,300	3,282,300	1,413,100	1,100,000	11%	79%
2016	386,300		-	1,000,000	3,092,500	437,000	3,378,300	1,339,500	1,000,000	0%	79%
2017	1,464,200		-	1,000,000	3,098,500	450,100	3,472,900	1,339,500	1,000,000	0%	79%
2018	998,200		-	1,000,000	3,103,800	463,600	3,570,000	1,339,500	1,000,000	0%	79%
2019	909,900		-	1,000,000	3,109,100	477,500	3,669,900	1,339,500	1,000,000	0%	79%
2020	664,200		-	1,000,000	3,114,400	491,800	3,772,400	1,339,500	1,000,000	3%	84%
2021	1,294,500		-	1,000,000	3,119,700	506,600	3,877,900	1,339,500	1,000,000	3%	90%
2022	1,002,900		-	1,000,000	3,125,700	521,800	3,986,300	1,339,500	1,000,000	3%	95%
2023	1,036,000		-	1,000,000	3,131,000	537,500	4,092,800	1,339,500	1,000,000	3%	101%
2024	1,070,200		-	1,000,000	3,136,300	553,600	4,202,100	1,339,500	1,000,000	4%	109%
2025	1,105,500		-	1,100,000	3,141,600	570,200	4,314,300	1,339,500	1,100,000	4%	117%
2026	1,142,000		-	1,100,000	3,147,600	587,300	4,429,500	1,339,500	1,100,000	4%	126%
2027	1,179,700		-	1,200,000	3,153,200	604,900	4,547,800	1,339,500	1,200,000	5%	137%
2028	1,218,600		-	1,200,000	3,158,800	623,000	4,669,100	1,339,500	1,200,000	5%	149%
2029	1,258,900		-	1,300,000	3,164,300	641,700	4,793,700	1,339,500	1,300,000	5%	162%
2030	1,300,400		-	1,300,000	3,169,900	661,000	4,921,600	1,339,500	1,300,000	5%	175%
2031	1,343,300		-	1,300,000	3,176,200	680,800	5,052,900	1,339,500	1,300,000	5%	189%
2032	1,387,600		-	1,400,000	3,181,800	701,200	5,187,700	1,339,500	1,400,000	5%	203%
2033	1,433,400		-	1,400,000	3,187,600	722,200	5,326,000	1,339,500	1,400,000	5%	218%
2034	1,480,700		-	1,500,000	3,193,200	743,900	5,467,900	1,339,500	1,500,000	5%	234%
2035	1,529,600		-	1,500,000	3,200,700	766,200	5,613,700	1,339,500	1,500,000	5%	251%
Total	29,531,400	23,500,000	28,200,000	25,300,000							

4.2.4 City of Troy

As shown for Piqua, the impact of the Joint Venture on Troy can be demonstrated by comparing the Capital Pro Forma, the Operating Pro Forma and the Long-term Business Plan for the base case with the JV. Based on the assumptions noted in the Base Case, pro formas and a business plan were generated for the City of Troy. Capital and Operating Pro Formas are shown in Tables 4.21 and 4.22, respectively. Participation in the JV will allow Troy to benefit from the sale of an asset while realizing operational savings associated with the treatment plant. The impact on revenue adjustments is shown in Table 4.23.

Table 4-21 – Five-Year Capital Pro Forma – City of Troy

Joint Venture

	2013	2014	2015	2016	2017
	$	$	$	$	$
Beginning Balance	-	-	-	6,500,000	6,500,000
Source of funds	**-**	**-**	**-**	**-**	**-**
Debt	-	8,500,000	-	-	100,000
Sale of Asset	-	-	30,000,000	-	-
Cash funding	-	-	700,000	600,000	900,000
Total Source of funds	-	8,500,000	30,700,000	600,000	1,000,000
Use of Funds	**-**	**-**	**-**	**-**	**-**
CIP	-	8,500,000	15,700,000	600,000	900,000
Loan Payment	-	-	8,500,000	-	-
Total Use of funds	-	8,500,000	24,200,000	600,000	900,000
Ending Balance	-	-	6,500,000	6,500,000	6,600,000

Table 4-22 – Five-Year Operating Pro Forma – City of Troy

Joint Venture

	2013	2014	2015	2016	2017
	$	$	$	$	$
Beginning Balance	1,000,000	921,100	921,500	918,450	940,950
Revenue					
User Charge Revenue	4,179,000	4,199,900	4,220,900	4,242,000	4,284,400
Revenue from Increase	-	462,000	506,500	509,000	514,100
Total User Charge revenue	4,179,000	4,661,900	4,727,400	4,751,000	4,798,500
Miscellaneous Revenue	350,900	350,900	350,900	350,900	350,900
Total Revenue	4,529,900	5,012,800	5,078,300	5,101,900	5,149,400
Expenses					
Operation and Maintenance	3,652,400	3,762,000	3,428,700	3,534,000	3,646,900
Cash finance CIP	-	-	700,000	600,000	900,000
Exising Debt Service					
1997 Refunded	561,400	559,150	555,900	551,650	556,400
1996 Refunded	395,000	393,750	396,750	393,750	-
Proposed Debt Service					
Short Term Loan	-	297,500	-	-	-
Total Expenses	4,608,800	5,012,400	5,081,350	5,079,400	5,103,300
Annual Balance	(78,900)	400	(3,050)	22,500	46,100
End of year Balance	921,100	921,500	918,450	940,950	987,050
Reserves	913,100	940,500	857,175	883,500	911,725
Debt Service Coverage	92%	100%	173%	166%	270%

Table 4-23 – Revenue Adjustments – City of Troy

	Revenue Adjustment	
	Annual	Cumulative
2013	0%	0%
2014	12%	12%
2015	0%	12%
2016	0%	12%
2017	0%	12%

Review of the long-term impacts on the revenues is summarized in Table 4.24. As noted in the far right column, the first five years of adjustments match that shown on the Operating Pro Forma. Increases thereafter are generally nominal and are noted when reserves are not at the 90 day level. The level of the increases mainly reflects the difference between the customer growth rate and inflationary impacts on operating and capital costs.

Table 4-24 – Business Plan Summary – City of Troy

	Capital Funding Plan			Joint Venture Operating Cash Flow					Revenue Adjustment	
	Capital Improvement Plan	Joint Venture	Cash Finance	Revenues under Existing Rates	Revenues from Increases	Operating Costs	Debt Service	Cash Finance Capital	Annual	Cumulative
	$		$	$	$	$	$	$		
2013	-		-	4,179,000	-	3,652,400	956,400	-	0%	0%
2014	-	8,500,000	-	4,199,900	462,000	3,762,000	1,250,400	-	12%	12%
2015	700,000	15,000,000	700,000	4,220,900	506,500	3,428,700	952,650	700,000	0%	12%
2016	600,000		600,000	4,242,000	509,000	3,534,000	945,400	600,000	0%	12%
2017	900,000		900,000	4,284,400	514,100	3,646,900	556,400	900,000	0%	12%
2018	1,400,000		1,400,000	4,327,300	519,300	3,763,500	-	1,400,000	0%	12%
2019	1,400,000		1,400,000	4,370,500	524,500	3,883,500	-	1,400,000	0%	12%
2020	1,300,000		1,300,000	4,414,200	529,700	4,007,500	-	1,300,000	0%	12%
2021	1,100,000		1,100,000	4,458,400	535,000	4,135,500	-	1,100,000	0%	12%
2022	1,100,000		1,100,000	4,503,000	540,400	4,267,400	-	1,100,000	0%	12%
2023	1,100,000		1,100,000	4,570,500	548,500	4,408,600	-	1,100,000	0%	12%
2024	1,100,000		1,100,000	4,639,100	556,700	4,554,200	-	1,100,000	0%	12%
2025	1,000,000		1,000,000	4,708,700	651,300	4,704,700	-	1,000,000	2%	14%
2026	1,000,000		1,000,000	4,779,300	756,700	4,860,100	-	1,000,000	2%	17%
2027	1,000,000		1,000,000	4,851,000	865,000	5,020,500	-	1,000,000	2%	19%
2028	1,000,000		1,000,000	4,923,700	976,600	5,186,200	-	1,000,000	2%	21%
2029	1,000,000		1,000,000	4,997,600	1,091,300	5,357,300	-	1,000,000	2%	24%
2030	1,000,000		1,000,000	5,072,600	1,209,200	5,534,100	-	1,000,000	2%	26%
2031	1,000,000		1,000,000	5,148,600	1,330,200	5,716,600	-	1,000,000	2%	29%
2032	1,000,000		1,000,000	5,225,900	1,454,400	5,904,900	-	1,000,000	2%	31%
2033	1,000,000		1,000,000	5,304,300	1,582,500	6,099,400	-	1,000,000	2%	34%
2034	1,000,000		1,000,000	5,383,800	1,714,100	6,300,200	-	1,000,000	2%	37%
2035	1,000,000		1,000,000	5,464,600	1,849,000	6,507,400	-	1,000,000	2%	39%
Total	21,700,000	23,500,000	21,700,000							

Appendix A – City of Piqua 2011 Ohio EPA Sanitary Survey Evaluation Report

Ohio | Environmental Protection Agency

John R. Kasich, Governor
Mary Taylor, Lt. Governor
Scott J. Nally, Director

November 3, 2011

RE: CITY OF PIQUA
MIAMI COUNTY
COMMUNITY WATER SYSTEM
PWS ID # 5501211,
2011 SANITARY SURVEY

City of Piqua
Mr. David Burtner, Director of Utilities
201 W. Water Street
Piqua, Ohio 45356

Dear Mr. Burtner:

On Thursday October 20th, 2011, I met with Mr. Don Freisthler, Water Plant Superintendent at the City of Piqua's water treatment facility. The purpose of the survey was to evaluate the ability of the system to provide an adequate, safe and potable drinking water that meets the requirements of the Ohio Safe Drinking Water Law, Chapter 6109 of the Ohio Revised Code, and the implementing regulations of the Ohio Administrative Code.

Identified below are regulatory requirements and information, if noted, for which action must be taken to return to compliance, and recommendations to address deficiencies that have the potential to cause future violations or contamination. Each of the following sections is the result of findings documented in the Sanitary Survey Evaluation Report.

A. REQUIREMENTS

Response Required

Plant Structural Integrity and Regulatory Compliance:

As stated in previous surveys and discussions, structural plant integrity is a continued concern. A tour of the treatment facility was conducted where extensive concrete structural and basin erosion were observed. Erosion in the flocculators, sedimentation, clarifiers and recarbonation basins was very apparent. Also, concrete erosion, cracks and exposed enforcing steel rods were seen in the settling basins and recarbonation basin. Deteriorated structural pillars inside the plant, as well as, the poor physical condition of the 1920's water plant itself were observed.

Southwest District Office
401 East Fifth Street
Dayton, OH 45402-2911

937 | 285 6357
937 | 285 6249 (fax)
www.epa.ohio.gov

Recent hydrogeological studies indicate insufficient groundwater source to supply the City with groundwater. The City has plans to build a new surface water plant or plans to collaborate with the City of Troy as a regional system. In order to maximize time, effort and remain in compliance, we believe, given the age, condition of the treatment facility and future regulatory requirements, Piqua must make a decision on its water source and treatment facility and proceed forward quickly. The City of Piqua is to continue to submit a semiannual update regarding the status of the study as well as improvements or decisions made regarding the water treatment plant. The last update was dated July 25, 2011. Please submit any updates by January 10th and July 10th of each year. Should you have any questions, I can be contacted at (937)-285-6117.

With the current surface water source and plant design, the City of Piqua will likely have difficulties meeting compliance of future regulations, in particular Disinfection/ Disinfection Byproducts(D/DBP). Disinfection/ Disinfection Byproducts are typically higher for surface waters due to the introduction of organics from surface water discharges. Should the City continue to using a surface water source for future supplies the watershed management practices will be a critical component to reduce the potential for DDBPs development. For assistance in developing a Source Water management plan, please visit the Ohio EPA website at http://www.epa.ohio.gov/ddagw/swap.aspx.

The City of Piqua is reminded of the Stage 2 Disinfection Byproducts(D/DBP) of future monitoring requirements based the on Initial Distribution System Evaluation (IDSE) data. The City is required to begin compliance monitoring starting January 1, 2013. Based on the IDSE and population, the City of Piqua is classified as schedule 3 and will be required to collect four samples every 90 days. Compliance is based on locational annual running average. Until Stage 2 monitoring begins, please continue monitoring using Stage 1 requirements. I have enclosed a fact sheet for your review.

Specific Ongoing Requirements:

a. Bacteria Monitoring:
Minimum sampling - 20 routine total coliform sample per month based on your current population of 20,522 users and 8,824 service connections. Note: Additional sampling is required should routine samples test coliform positive.

b. Monthly Operating reports:
Submit to the District Office no later the 10th of the following month.

c. Contingency Plan/Sample Monitoring Plan:
During the survey visit, it was noted the City's contingency plan was updated in October 2011. As a reminder, your contingency plan is to be updated annually.

For all other monitoring or reporting requirements, please refer to your annual chemical monitoring schedule.

B. RECOMMENDATIONS

The following deficiencies are not regulatory violations, but are actions recommended by this Agency for optimum operation and to reduce the potential for future violations or contamination:

1. During the day of the survey, it was observed that the City of Piqua distribution system experienced a 6-inch main break during routine hydrant flushing. The break may have been be caused by the improper closing of the hydrant valves. The City is encouraged to review its flushing procedures to ensure future breaks do not occur due to hydraulic pressure differentials, which may be caused by incorrect hydrant operation.

2. To help insure uninterrupted service water, it is recommended that routine tower inspections and maintenance be performed on each of the City's storage tanks. In addition, the City of Piqua must continue to maintain current treatment plant equipment, as needed, to ensure the treatment facility operates with efficiency. This includes exercising high service pumps monthly, following routine maintenance schedules and properly repairing failing plant equipment.

3. As stated in the past that during the planning phase, the City should consider an emergency connection with the City of Troy or Sidney in the event of plant failure.

4. Please review the additional information concerning existing and upcoming drinking water regulations and requirements on our Web site at http://www.epa.state.oh.us/ddagw/oac.html.

C. REQUIRED RESPONSES

Section A- Please continue to submit semiannual updates regarding the status of any progress, improvements or decisions made regarding the water treatment plant. Updates are to be submitted to this office by July 10th and January 10th.

If you have any questions regarding this letter, or any other matter involving your water system, please feel free to contact me at 937-285-6117.

Sincerely,

John McDaniel

John McDaniel
Public Drinking Water Unit

cc: Don Freisthler, Water Superintendent, City of Piqua
Dave Bornino, Engineering and Operations, DDAGW/CO
Miami County Local Health Department

JM/ca

Appendix B – City of Troy 2010 Ohio EPA Sanitary Survey Evaluation Report

Ohio | Environmental Protection Agency

Ted Strickland, Governor
Lee Fisher, Lt. Governor
Chris Korleski, Director

COPY

TIM RAY,
WATER PLANT SUPERINTENDENT

May 5, 2010

Mr. Michael Beamish, Mayor
100 South Market Street
Troy, Ohio 45373-7303

Re: City of Troy, Miami County, Community Public Water Supply, PWS ID #5501612, STU #5556495, 2010 Sanitary Survey

On April 6, 2010, I met with Tim Ray, Plant Superintendent, Jeff Monce, Assistant Superintendent and Distribution Chief Tom Parson to evaluate the City of Troy's Water Treatment Plant. On April 8, 2010, a second visit was made to the City's storage towers. The purpose of the survey was to evaluate the ability of the system to provide an adequate, safe and potable drinking water that meets the requirements of the Ohio Safe Drinking Water Law, Chapter 6109 of the Ohio Revised Code, and the implementing regulations of the Ohio Administrative Code.

Identified below are regulatory requirements, if noted, for which action must be taken to return to compliance, and recommendations to address deficiencies that have the potential to cause future violations or contamination. Each of the following sections is the results of findings documented in the Sanitary Survey Evaluation Report.

As a result of the inspection I have the following comments:

A. SYSTEM SUMMARY:

1.	Population:		22,000
2.	Service Connections:		10,561
3.	Plant Production		
	a.	Plant Design Capacity:	16.0 MGD (Million Gallon per Day)
	b.	Source Capacity:	13.6 MGD with largest well out of service
	c.	Average Daily:	3.86 MGD
	d.	Peak Day:	5.46 MGD, August 11, 2009

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401 East Fifth Street
Dayton, OH 45402-2911

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937 | 285 6249 (fax)
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4. System Components

a.	Source:	10 groundwater wells
b.	Treatment:	Lime soda softening, coagulation, sedimentation, gas chlorination, stabilization, re carbonation and filtration
c.	Storage:	4.0 MG clear well Three storage tanks totaling 3.5 MG
d.	Booster Station:	2.5 MGD capacity booster station

B. SOURCE CAPACITY:

Based on the available documentation found in our files and data base, the approved capacity of Troy's well fields, with the largest well out of service, is 9,486 gpm or 13.6 million gallons per day (MGD). The treatment plant is rated 16.0 MGD or 2.6 MGD greater than the *source* capacity. With historical peak usage documented at 5.46 MGD, it appears the City of Troy has approximately 8 MGD in excess source capacity.

Should the City believe that this information is incorrect and have information that supports additional source capacity, it should be provided for our review. It may be necessary to conduct pumping tests with the results submitted for formal review before any additional source capacity can be assigned.

C. REQUIREMENTS:

Specific Deficiencies:

No deficiencies were noted with water treatment.

Specific Ongoing Requirements:

a. Bacteria Monitoring:
   Minimum sampling – 25 routine total coliform samples per month based on your current population of 22,000 users. Note: Additional sampling is required should routine samples test coliform positive.

b. Monthly Operating reports:
Submitted to the District Office no later than the 10th of the following month.

c. Quarterly Maximum Residual Disinfection Level (MRDL):
Submitted to the District Office no later than the 10th of the month following the quarterly monitoring period.

d. Contingency Plan/Sample Monitoring Plan:
Ensure annual update of each is made annually.

For all other monitoring or reporting requirements please refer to your annual chemical monitoring schedule.

During the survey, it was observed that the City of Troy treatment plant was very clean, orderly, well operated and managed. It is obvious that the City, Water Superintendent Tim Ray and his staff take great pride and care in supplying the citizens of Troy with high quality water.

D. RECOMMENDATIONS and RESPONSES:

The following deficiencies are not regulatory violations, but are actions recommended by this Agency for optimum operation.

1. If there is a discrepancy concerning the source capacity, please respond to Section B by June 15, 2010.

2. During the survey, it was noted that Troy's distribution system lacks a proper valve exercise and flushing program. Proper valve exercise, preventive maintenance and hydrant flushing programs are important to reduce water quality complaints and property loss thru non functioning hydrants during a residential fire. The City should routinely flush and exercise its valves to ensure good water quality and adequate water flow.

3. Please note that additional information concerning existing and upcoming drinking water regulations and requirements can be obtained from our Web site at http://www.epa.state.oh.us/ddagw/.

If you have any questions regarding this letter, or any other matter involving your water system, please feel free to contact me at 937-285-6117.

Sincerely,

John McDaniel
Public Drinking Water Unit, Ohio EPA, SWDO

cc: Patrick Titterington, Director of Public Service and Safety
Tim Ray, Water Plant Superintendent
Engineering and Operations, DDAGW/CO

JM\bp

OhioEPA

State of Ohio
Environmental Protection Agency

Division of Drinking and Ground Waters

Sanitary Survey Evaluation Report

TROY CITY PWS

PWS ID: OH5501612

Primary Survey Officer: John McDaniel

Survey Date(s): 4/6/2010 -- 4/8/2010

Contents:

Sanitary Survey Evaluation Questions and Responses

General / Background Info / Name/Location

1.	PWS number:	OH5501612
2.	Name of public water system:	TROY CITY PWS

General / Background Info / Classification

1.	PWS Type:	C - Community
2.	PWS Source Type?	GW - Groundwater
3.	Total System - Design Water Production / Treatment Capacity:	13,600,000
4.	Total System - Design Water Production / Treatment Capacity Units:	GPD - Gallons Per Day
5.	Average daily demand?	3.86
6.	Average daily demand units?	MGD - Millions of Gallons Per Day
7.	Emergency production capacity:	13.6
	During a power failure 6.9 MGD is available based upon wells 13-17-16-19-3W wells. Powered by auxillary power.	
8.	Emergency production capacity units:	MGD - Millions of Gallons Per Day
9.	Number of service connections:	10561
10.	Service Connection Type?	CB - Combined
11.	Are service connections metered?	ME - Metered
12.	Population Served:	22,000
13.	Population Served Type:	R - Residential
15.	Seasonal operation - Month open:	1
16.	Seasonal operation - Day open:	1
17.	Seasonal operation - Month closed:	12
18.	Seasonal operation - Day closed:	31

General / Background Info / Current Survey Info / Participants

1.	*Water system representatives present during the survey:*	
1.01	Last Name #1:	Ray
1.02	First Name #1:	Tim
1.03	Title #1:	Superintendent
1.04	Last Name #2:	Monce
1.05	First Name #2:	Jeff

General / Background Info / Current Survey Info / Participants

1.06	Title #2:	Asst. Superintendent
1.07	Last Name #3:	Parsons
1.08	First Name #3:	Tom
1.09	Title #3:	Distribution Chief

General / Background Info / Current Survey Info / Sampling

1.	Samples taken at the time of survey by inspector?	No

Sources / Consecutive Connection / General

1.	Purchase water?	No

Sources / Raw Water Quality Monitoring

1.	Is raw water quality monitored, if yes indicate parameters and typical ranges experienced?	Yes
1.01	Parameter 1	Bacteria
	monthly	
1.02	Parameter 1 Range:	
1.03	Parameter 2	Static levels
	every other week	
1.04	Parameter 2 Range:	
1.05	Parameter 3	Draw down
	every other week	
1.06	Parameter 3 Range:	

Sources / Groundwater / TROY, CITY OF WELL 016 - (Active) / General

1.	Is the well located in a floodway or floodplain:	Neither
2.	If located in a floodway, have efforts been made to protect the wells to minimize damage from floodwater or debris?	NA
3.	Required Isolation Radius for the Well (ft):	300
4.	Does the PWS own or have sanitary easements for the required isolation radius?	Yes
5.	*Are any of the following contamination sources within the required isolation radius for this well?*	
6.	-Sewer Lines, Septic Tanks, Leach Fields, or Outhouses	Yes
	Within a 100 feet of ductle 8 inch	

Sources / Groundwater / TROY, CITY OF WELL 016 - (Active) / General

7.	-Livestock Feedlots	No
8.	-USTs	No
9.	-Chemical Storage (if not approved or necessary for water production)	No
10.	-Inactive Wells (if not properly maintained in accordance with OEPA rule)	No
11.	-Other:	No
12.	Are any of the above sources of contamination newly identified/installed since the last sanitary survey?	No
13.	Is the well cased and sealed in such a manner that surface water cannot enter the well?	Yes
14.	Is the well cap appropriate?	Yes
15.	Is the ground sloped away from the casing?	Yes
17.	Does the well casing terminate below ground (i.e. within a pit or other subsurface structure).	No
18.	Is the well vented?	Yes
18.01	Is the well vented at least 3 feet above the 100 year flood level?	Yes
18.02	Is the vent turned down and screened?	Yes
21.	Is the well located within a well house or other structure?	No
25.	Is drawdown measured?	Yes
	weekly	
25.01	If yes, how often?	Other
	every other week	
28.	How many hours per day is the pump operated?	24
29.	Describe alternating sequence:	
	rotation made every week	
30.	Is the control system appropriate and operational?	Yes
31.	Have any modifications been made to the well?	No
34.	General Condition of the Well?	Acceptable But Needs Improvements
35.	General Comments 1:	
36.	General Comments 2:	
37.	General Comments 3:	

Sources / Groundwater / TROY, CITY OF WELL 019 - (Active) / General

1.	Is the well located in a floodway or floodplain:	Neither
2.	If located in a floodway, have efforts been made to protect the wells to minimize damage from floodwater or debris?	NA
3.	Required Isolation Radius for the Well (ft):	300
4.	Does the PWS own or have sanitary easements for the required isolation radius?	Yes
5.	*Are any of the following contamination sources within the required isolation radius for this well?*	
6.	-Sewer Lines, Septic Tanks, Leach Fields, or Outhouses	No
7.	-Livestock Feedlots	No
8.	-USTs	No
9.	-Chemical Storage (if not approved or necessary for water production)	No
10.	-Inactive Wells (if not properly maintained in accordance with OEPA rule)	No
11.	-Other:	No
12.	Are any of the above sources of contamination newly identified/installed since the last sanitary survey?	No
13.	Is the well cased and sealed in such a manner that surface water cannot enter the well?	Yes
14.	Is the well cap appropriate?	Yes
15.	Is the ground sloped away from the casing?	Yes
17.	Does the well casing terminate below ground (i.e. within a pit or other subsurface structure).	No
18.	Is the well vented?	Yes
18.01	Is the well vented at least 3 feet above the 100 year flood level?	Yes
18.02	Is the vent turned down and screened?	Yes
21.	Is the well located within a well house or other structure?	No
25.	Is drawdown measured?	Yes
	weekly	
25.01	If yes, how often?	
28.	How many hours per day is the pump operated?	24

Sources / Groundwater / TROY, CITY OF WELL 019 - (Active) / General

29.	Describe alternating sequence:	rotation changed every week
30.	Is the control system appropriate and operational?	Yes
31.	Have any modifications been made to the well?	Yes
31.01	Date:	08/26/2005
31.02	Description:	changed to VT
31.03	Was plans approved for the modifications?	Yes
34.	General Condition of the Well?	Acceptable
35.	General Comments 1:	
36.	General Comments 2:	
37.	General Comments 3:	

Sources / Groundwater / TROY, CITY OF WELL 0E04 - (Active) / General

1.	Is the well located in a floodway or floodplain:	Neither
2.	If located in a floodway, have efforts been made to protect the wells to minimize damage from floodwater or debris?	NA
3.	Required Isolation Radius for the Well (ft):	300
4.	Does the PWS own or have sanitary easements for the required isolation radius?	Yes
5.	*Are any of the following contamination sources within the required isolation radius for this well?*	
6.	-Sewer Lines, Septic Tanks, Leach Fields, or Outhouses	No
7.	-Livestock Feedlots	No
8.	-USTs	No
9.	-Chemical Storage (if not approved or necessary for water production)	No
10.	-Inactive Wells (if not properly maintained in accordance with OEPA rule)	No
11.	-Other:	No
12.	Are any of the above sources of contamination newly identified/installed since the last sanitary survey?	No

Sources / Groundwater / TROY, CITY OF WELL 0E04 - (Active) / General

13.	Is the well cased and sealed in such a manner that surface water cannot enter the well?	Yes
14.	Is the well cap appropriate?	Yes
15.	Is the ground sloped away from the casing?	Yes
17.	Does the well casing terminate below ground (i.e. within a pit or other subsurface structure).	No
18.	Is the well vented?	Yes
18.01	Is the well vented at least 3 feet above the 100 year flood level?	Yes
18.02	Is the vent turned down and screened?	Yes
21.	Is the well located within a well house or other structure?	Yes
21.01	- If yes, is it kept clean, in good repair and not used to store toxic or hazardous materials?	Yes
21.02	- If yes, are heating, ventilation and lighting adequate?	Yes
25.	Is drawdown measured?	Yes
25.01	If yes, how often?	weekly
28.	How many hours per day is the pump operated?	24
29.	Describe alternating sequence:	rotation made every week
30.	Is the control system appropriate and operational?	Yes
31.	Have any modifications been made to the well?	Yes
31.01	Date:	03/29/1993
31.02	Description:	brought out of pit
31.03	Was plans approved for the modifications?	Yes
34.	General Condition of the Well?	Acceptable
35.	General Comments 1:	
36.	General Comments 2:	
37.	General Comments 3:	

Sources / Groundwater / TROY, CITY OF WELL 0W03 - (Active) / General

1.	Is the well located in a floodway or floodplain:	Neither
2.	If located in a floodway, have efforts been made to protect the wells to minimize damage from floodwater or debris?	NA
3.	Required Isolation Radius for the Well (ft):	300
4.	Does the PWS own or have sanitary easements for the required isolation radius?	Yes
5.	*Are any of the following contamination sources within the required isolation radius for this well?*	
6.	-Sewer Lines, Septic Tanks, Leach Fields, or Outhouses	No
7.	-Livestock Feedlots	No
8.	-USTs	No
9.	-Chemical Storage (if not approved or necessary for water production)	No
10.	-Inactive Wells (if not properly maintained in accordance with OEPA rule)	No
11.	-Other:	No
12.	Are any of the above sources of contamination newly identified/installed since the last sanitary survey?	No
13.	Is the well cased and sealed in such a manner that surface water cannot enter the well?	Yes
14.	Is the well cap appropriate?	Yes
15.	Is the ground sloped away from the casing?	Yes
17.	Does the well casing terminate below ground (i.e. within a pit or other subsurface structure).	No
18.	Is the well vented?	Yes
18.01	Is the well vented at least 3 feet above the 100 year flood level?	Yes
18.02	Is the vent turned down and screened?	Yes
21.	Is the well located within a well house or other structure?	Yes
21.01	- If yes, is it kept clean, in good repair and not used to store toxic or hazardous materials?	Yes
21.02	- If yes, are heating, ventilation and lighting adequate?	Yes

Sources / Groundwater / TROY, CITY OF WELL 0W03 - (Active) / General

25.	Is drawdown measured?	Yes
	weekly	
25.01	If yes, how often?	
28.	How many hours per day is the pump operated?	24
29.	Describe alternating sequence:	
	rotation changed every week	
30.	Is the control system appropriate and operational?	Yes
31.	Have any modifications been made to the well?	Yes
31.01	Date:	05/01/1989
31.02	Description:	relined
31.03	Was plans approved for the modifications?	Yes
34.	General Condition of the Well?	Acceptable
35.	General Comments 1:	
36.	General Comments 2:	
37.	General Comments 3:	

Sources / Groundwater / TROY, CITY OF WELL 0W04 - (Active) / General

1.	Is the well located in a floodway or floodplain:	Neither
2.	If located in a floodway, have efforts been made to protect the wells to minimize damage from floodwater or debris?	NA
3.	Required Isolation Radius for the Well (ft):	300
4.	Does the PWS own or have sanitary easements for the required isolation radius?	Yes
5.	*Are any of the following contamination sources within the required isolation radius for this well?*	
6.	-Sewer Lines, Septic Tanks, Leach Fields, or Outhouses	No
7.	-Livestock Feedlots	No
8.	-USTs	No
9.	-Chemical Storage (if not approved or necessary for water production)	No
10.	-Inactive Wells (if not properly maintained in accordance with OEPA rule)	No

Sources / Groundwater / TROY, CITY OF WELL 0W04 - (Active) / General

11.	-Other:	No
12.	Are any of the above sources of contamination newly identified/installed since the last sanitary survey?	No
13.	Is the well cased and sealed in such a manner that surface water cannot enter the well?	Yes
14.	Is the well cap appropriate?	Yes
15.	Is the ground sloped away from the casing?	Yes
17.	Does the well casing terminate below ground (i.e. within a pit or other subsurface structure).	No
18.	Is the well vented?	Yes
18.01	Is the well vented at least 3 feet above the 100 year flood level?	Yes
18.02	Is the vent turned down and screened?	Yes
21.	Is the well located within a well house or other structure?	Yes
21.01	- If yes, is it kept clean, in good repair and not used to store toxic or hazardous materials?	Yes
21.02	- If yes, are heating, ventilation and lighting adequate?	Yes
25.	Is drawdown measured?	Yes
	weekly	
25.01	If yes, how often?	
28.	How many hours per day is the pump operated?	24
29.	Describe alternating sequence:	
	rotation changed every week	
30.	Is the control system appropriate and operational?	Yes
31.	Have any modifications been made to the well?	Yes
31.01	Date:	02/14/1999
31.02	Description:	relined , new screen
31.03	Was plans approved for the modifications?	Yes
34.	General Condition of the Well?	Acceptable
35.	General Comments 1:	
36.	General Comments 2:	

Sources / Groundwater / TROY, CITY OF WELL 0W04 - (Active) / General

37.	General Comments 3:	

Sources / Groundwater / TROY, CITY OF WELL 0W12 - (Active) / General

1.	Is the well located in a floodway or floodplain:	Neither
2.	If located in a floodway, have efforts been made to protect the wells to minimize damage from floodwater or debris?	NA
3.	Required Isolation Radius for the Well (ft):	300
4.	Does the PWS own or have sanitary easements for the required isolation radius?	Yes
5.	*Are any of the following contamination sources within the required isolation radius for this well?*	
6.	-Sewer Lines, Septic Tanks, Leach Fields, or Outhouses	Yes
	Lift station within 300 feet	
7.	-Livestock Feedlots	No
8.	-USTs	No
9.	-Chemical Storage (if not approved or necessary for water production)	No
10.	-Inactive Wells (if not properly maintained in accordance with OEPA rule)	No
11.	-Other:	No
12.	Are any of the above sources of contamination newly identified/installed since the last sanitary survey?	No
13.	Is the well cased and sealed in such a manner that surface water cannot enter the well?	Yes
14.	Is the well cap appropriate?	Yes
15.	Is the ground sloped away from the casing?	Yes
17.	Does the well casing terminate below ground (i.e. within a pit or other subsurface structure).	No
18.	Is the well vented?	Yes
18.01	Is the well vented at least 3 feet above the 100 year flood level?	Yes
18.02	Is the vent turned down and screened?	Yes
21.	Is the well located within a well house or other structure?	No
25.	Is drawdown measured?	Yes

Sources / Groundwater / TROY, CITY OF WELL 0W12 - (Active) / General

25.01 If yes, how often?

weekly

28. How many hours per day is the pump operated? 24

29. Describe alternating sequence:

rotation changed every weekly

30. Is the control system appropriate and operational? Yes

31. Have any modifications been made to the well? No

34. General Condition of the Well? Acceptable But Needs Improvements

35. General Comments 1:

36. General Comments 2:

37. General Comments 3:

Sources / Groundwater / TROY, CITY OF WELL 0E13 - (Active) / General

1. Is the well located in a floodway or floodplain: Neither

2. If located in a floodway, have efforts been made to protect the wells to minimize damage from floodwater or debris? NA

3. Required Isolation Radius for the Well (ft): 300

4. Does the PWS own or have sanitary easements for the required isolation radius? Yes

5. *Are any of the following contamination sources within the required isolation radius for this well?*

6. -Sewer Lines, Septic Tanks, Leach Fields, or Outhouses No

7. -Livestock Feedlots No

8. -USTs No

9. -Chemical Storage (if not approved or necessary for water production) No

10. -Inactive Wells (if not properly maintained in accordance with OEPA rule) No

11. -Other: No

12. Are any of the above sources of contamination newly identified/installed since the last sanitary survey? No

13. Is the well cased and sealed in such a manner that surface water cannot enter the well? Yes

Sources / Groundwater / TROY, CITY OF WELL 0E13 - (Active) / General

14. Is the well cap appropriate? Yes

15. Is the ground sloped away from the casing? Yes

17. Does the well casing terminate below ground (i.e. within a pit or other subsurface structure). No

18. Is the well vented? Yes

18.01 Is the well vented at least 3 feet above the 100 year flood level? Yes

18.02 Is the vent turned down and screened? Yes

21. Is the well located within a well house or other structure? No

25. Is drawdown measured? Yes

weekly

25.01 If yes, how often?

28. How many hours per day is the pump operated? 24

29. Describe alternating sequence:

Rotation changed weekly

30. Is the control system appropriate and operational? Yes

31. Have any modifications been made to the well? No

34. General Condition of the Well? Acceptable

35. General Comments 1:

36. General Comments 2:

37. General Comments 3:

Sources / Groundwater / TROY, CITY OF WELL 0E17 - (Active) / General

1. Is the well located in a floodway or floodplain: Neither

2. If located in a floodway, have efforts been made to protect the wells to minimize damage from floodwater or debris? NA

3. Required Isolation Radius for the Well (ft): 300

4. Does the PWS own or have sanitary easements for the required isolation radius? Yes

5. *Are any of the following contamination sources within the required isolation radius for this well?*

Sources / Groundwater / TROY, CITY OF WELL 0E17 - (Active) / General

6.	-Sewer Lines, Septic Tanks, Leach Fields, or Outhouses	No
7.	-Livestock Feedlots	No
8.	-USTs	No
9.	-Chemical Storage (if not approved or necessary for water production)	No
10.	-Inactive Wells (if not properly maintained in accordance with OEPA rule)	No
11.	-Other:	No
12.	Are any of the above sources of contamination newly identified/installed since the last sanitary survey?	No
13.	Is the well cased and sealed in such a manner that surface water cannot enter the well?	Yes
14.	Is the well cap appropriate?	Yes
15.	Is the ground sloped away from the casing?	Yes
17.	Does the well casing terminate below ground (i.e. within a pit or other subsurface structure).	No
18.	Is the well vented?	Yes
18.01	Is the well vented at least 3 feet above the 100 year flood level?	Yes
18.02	Is the vent turned down and screened?	Yes
21.	Is the well located within a well house or other structure?	No
25.	Is drawdown measured?	Yes
25.01	If yes, how often?	

weekly

28.	How many hours per day is the pump operated?	24
29.	Describe alternating sequence:	

Rotation changed weekly

30.	Is the control system appropriate and operational?	Yes
31.	Have any modifications been made to the well?	No
34.	General Condition of the Well?	Acceptable
35.	General Comments 1:	
36.	General Comments 2:	

Sources / Groundwater / TROY, CITY OF WELL 0E17 - (Active) / General

37. General Comments 3:

Sources / Groundwater / TROY, CITY OF WELL 0E14 - (Active) / General

1.	Is the well located in a floodway or floodplain:	Neither
2.	If located in a floodway, have efforts been made to protect the wells to minimize damage from floodwater or debris?	NA
3.	Required Isolation Radius for the Well (ft):	300
4.	Does the PWS own or have sanitary easements for the required isolation radius?	Yes
5.	*Are any of the following contamination sources within the required isolation radius for this well?*	
6.	-Sewer Lines, Septic Tanks, Leach Fields, or Outhouses	No
7.	-Livestock Feedlots	No
8.	-USTs	No
9.	-Chemical Storage (if not approved or necessary for water production)	No
10.	-Inactive Wells (if not properly maintained in accordance with OEPA rule)	No
11.	-Other:	No
12.	Are any of the above sources of contamination newly identified/installed since the last sanitary survey?	No
13.	Is the well cased and sealed in such a manner that surface water cannot enter the well?	Yes
14.	Is the well cap appropriate?	Yes
15.	Is the ground sloped away from the casing?	Yes
17.	Does the well casing terminate below ground (i.e. within a pit or other subsurface structure).	No
18.	Is the well vented?	Yes
18.01	Is the well vented at least 3 feet above the 100 year flood level?	Yes
18.02	Is the vent turned down and screened?	Yes
21.	Is the well located within a well house or other structure?	No
25.	Is drawdown measured?	Yes

Sources / Groundwater / TROY, CITY OF WELL 0E14 - (Active) / General

25.01	If yes, how often?	weekly
28.	How many hours per day is the pump operated?	24
29.	Describe alternating sequence:	rotation changed every week
30.	Is the control system appropriate and operational?	Yes
31.	Have any modifications been made to the well?	No
34.	General Condition of the Well?	Acceptable
35.	General Comments 1:	
36.	General Comments 2:	
37.	General Comments 3:	

Sources / Groundwater / TROY, CITY OF WELL 0E18 - (Active) / General

1.	Is the well located in a floodway or floodplain:	Neither
2.	If located in a floodway, have efforts been made to protect the wells to minimize damage from floodwater or debris?	NA
3.	Required Isolation Radius for the Well (ft):	300
4.	Does the PWS own or have sanitary easements for the required isolation radius?	Yes
5.	*Are any of the following contamination sources within the required isolation radius for this well?*	
6.	-Sewer Lines, Septic Tanks, Leach Fields, or Outhouses	No
7.	-Livestock Feedlots	No
8.	-USTs	No
9.	-Chemical Storage (if not approved or necessary for water production)	No
10.	-Inactive Wells (if not properly maintained in accordance with OEPA rule)	No
11.	-Other:	No
12.	Are any of the above sources of contamination newly identified/installed since the last sanitary survey?	No
13.	Is the well cased and sealed in such a manner that surface water cannot enter the well?	Yes

Sources / Groundwater / TROY, CITY OF WELL 0E18 - (Active) / General

14.	Is the well cap appropriate?	Yes
15.	Is the ground sloped away from the casing?	Yes
17.	Does the well casing terminate below ground (i.e. within a pit or other subsurface structure).	No
18.	Is the well vented?	Yes
18.01	Is the well vented at least 3 feet above the 100 year flood level?	Yes
18.02	Is the vent turned down and screened?	Yes
21.	Is the well located within a well house or other structure?	No
25.	Is drawdown measured?	Yes
25.01	If yes, how often?	weekly
28.	How many hours per day is the pump operated?	24
29.	Describe alternating sequence:	
30.	Is the control system appropriate and operational?	Yes
31.	Have any modifications been made to the well?	No
34.	General Condition of the Well?	Acceptable
35.	General Comments 1:	
36.	General Comments 2:	
37.	General Comments 3:	

TROY CITY - (Active) / General / General

1.	Operator of Record First Name:	Tim
2.	Operator of Record Last Name:	Ray
3.	Certification Number:	
4.	Are there additional Operators of Record listed for the plant?	Yes
4.01	List names and Cert numbers of additional Operators of Record.	Jeff Monce
6.	Water Treatment Plant Classification:	CLASS 3
7.	Does the operator(s) of record have a valid certification equal to or greater than the facility classification?	Yes

TROY CITY - (Active) / General / General

8.	Hours/week the Operator(s) of Record physically present to perform or oversee the technical operation of the PWS/plant?	40
9.	Is the plant checked daily (7 day/wk) when in operation by an operator or other facility personnel?	Yes
10.	Describe Entry Point Location (include SMP ID#)	Plant Tap
11.	Plant Capacity:	16000000
12.	Plant Capacity Units	GPD - Gallons Per Day
13.	Limiting factor for plant capacity:	well field
	well field capacity is 13.6 MGD	
14.	Is emergency power available?	YES - Yes
15.	Average production during past 12 months:	3.86
	MGD	
16.	Maximum production during past 12 months:	5.46
	MGD on August 11, 2009	

TROY CITY - (Active) / General / Chemical Use

1.	Are any water treatment chemical utilized?	Yes
1.01	Are there a minimum of two operable feeders provided for each chemical?	Yes
1.02	Have all chemicals and feeders been certified to NSF Standard 60/61 (By NSF, ANSI or other approved certification agency.)	Yes
1.03	Have the chemical feeders been calibrated to ensure consistent feed rates?	No
1.04	Are chemical feeders and pumps operated in the middle 1/3 range?	Yes
1.05	Is the chemical feed equipment readily accessible for servicing, repair, and observation of operation?	Yes
1.06	Do subsurface locations for solution tanks have positive drainage for groundwater, accumulated water, chemical spills, and overflows?	Yes
1.07	Is a weight scale or other measurement equipment provided capable of reasonable precision in relation to the average dose for each chemical?	Yes
1.08	Do all chemicals have dedicated feed lines?	Yes
1.09	Are the feed lines easily accessible throughout the entire length and protected from freezing or excessive heat?	Yes

TROY CITY - (Active) / General / Chemical Use

1.1	Are feed lines made of durable, corrosion-resistant material?	Yes
1.11	Do daily operating records (bench sheets) reflect chemical dosages and total quantities used?	Yes
1.12	Is there an adequate inventory of all chemicals (30 days)?	Yes
1.13	Are chemical storage areas clean and dry?	Yes
1.14	Are chemicals appropriately stored (no incompatible materials, proper containers, Bulk tanks hatches sealed and properly vented, etc.)?	Yes
1.15	Is there a procedure in place to ensure that water system personnel are present when chemicals are delivered?	Yes
1.16	Are the storage units, solution tanks, fill lines and feed lines appropriately labeled?	Yes
1.17	Are the storage units, solution tanks, fill lines and feed lines free from excessive corrosion or other signs of deterioration?	Yes
1.18	*LIQUID*	
1.19	Are all liquid chemicals fed from a "day tank"?	Yes
1.2	Do all day tanks hold a 30 hour supply or less of the chemical solution?	Yes
1.21	Is the solution tank covered to prevent the introduction of contaminants and to minimize any corrosive vapors?	Yes
1.22	Is an anti-siphon devices provided so that liquid chemical solutions cannot be siphoned through solution feeders into the water supply?	Yes
1.23	Is the transfer pump from the bulk tank or drum to the solution tank operated manually?	Yes
1.24	Are there adequate spill containment provisions (secondary containment)?	Yes
1.25	*SOLID*	
1.26	How is the feed quantity of dry chemical determined?	Weight
1.27	Does the dry chemical feeders provide adequate solution water and agitation of the chemical in the solution tank?	Yes
1.28	Does the dry chemical feeder gravity feed from the solution tanks?	Yes
1.29	If not, are the size/type of transfer pumps appropriate?	Yes
1.3	Feed lines free from plugging problems?	Yes

TROY CITY - (Active) / General / Chemical Use

1.31	Is the chemical feed equipment located in a separate room to reduce hazards and dust problems?	Yes

TROY CITY - (Active) / Chlorination / Gaseous Chlorination

1.	*General*	
3.	Dosage (mg/L):	2.9
4.	Treatment Goal:	disinfection
5.	Is there an alarm tied to interruption in the chlorine feed?	Yes
6.	Is there an automatic switch over of chlorine cylinders provided to assure continuous operations?	Yes
7.	Are the pipes carrying elemental liquid or dry gaseous chlorine under pressure made of an appropriate material (not PVC)?	NA
8.	Is all pressurized chlorine gas injected to a solution line within the chlorinator room?	NA
9.	Is rubber, PVC, polyethylene, or other materials recommended by the Chlorine Institute used for chlorine solution piping and fittings?	Yes
10.	Are the chlorine feed makeup water and injection points free from cross-connections?	Yes
11.	Is there a chlorine leak detector properly located for monitoring any leaks (near the floor)?	Yes
12.	Are automatic detectors tested at least monthly?	Yes
13.	Is the detection level set on the low range?	Yes
14.	Is a bottle of ammonium hydroxide (56% ammonia solution) available for leak detection?	Yes
15.	Are safe practices followed during cylinder changes and maintenance?	Yes
16.	Is there an appropriate leak repair kit approved by the Chlorine Institute provided?	Yes
17.	Is the chlorine gas feed and storage enclosed and isolated from other operating areas?	Yes
18.	Is the chlorine feed/storage room located in a low population density area?	No
19.	Are the chlorinator rooms heated to approximately 60 degrees F and protected from excessive heat?	Yes

TROY CITY - (Active) / Chlorination / Gaseous Chlorination

20.	Can the feed equipment be inspected without entering the chlorine room?	Yes
21.	Is the chlorine room provided with doors equipped with panic hardware, assuring ready means of exit and opening outward only to the building exterior?	Yes
22.	Does the chlorine room have an operable ventilating fan with a capacity that provides one complete air change per minute when the room is occupied?	Yes
23.	Injection Point:	before filters
24.	Does the ventilating fan take suction near the floor and are all air inlets located near the ceiling and fitted with louvers?	Yes
25.	Are there separate switches for the fan and lights located outside the chlorine room and at the inspection window?	Yes
26.	Are vents from feeders and storage discharged to the outside atmosphere, above grade?	Yes
27.	Are full and empty cylinders restrained in position to prevent upset and properly labeled?	Yes
28.	*Disinfection*	
29.	Since the last inspection has the disinfection process operated uninterrupted while water was being produced?	Yes
30.	What is the residual goal for the entry point to the distribution system (mg/L)?	0.5
31.	Is the disinfectant contact time determined each day during peak hourly flow?	Yes
32.	Does the PWS use the DPD or other appropriate method that utilizes a digital readout with a self-contained light source to measure chlorine residual?	Yes
33.	Has the testing equipment been calibrated within the past 3 months?	Yes
34.	For all surface water treatment plants serving a population greater than 3300, do they have equipment to measure chlorine residuals continuously entering the distribution system?	NA
35.	Is the continuous chlorine monitoring equipment calibrated daily?	Yes
36.	General Condition of Gaseous Chlorine Feed Equipment:	Acceptable
37.	Is the treatment unit in a condition that represents an immediate threat to health, safety or in danger of failure?	No

TROY CITY - (Active) / Chlorination / Gaseous Chlorination

38. General Comments 1:

39. General Comments 2:

40. General Comments 3:

TROY CITY - (Active) / Filtration / General

1.	Filtration treatment goal(s)?	remove solids, Fe and Mn
2.	Are stated treatment goals being consistently met?	Yes
3.	Are the filters operated to minimize flow variations?	Yes
4.	Are instrumentation and controls for the process operational, and in service?	Yes
5.	Has there been any modifications to the filters since the last survey?	Yes
5.01	Describe modifications:	Added 2 inches of anthracite in 2008

TROY CITY - (Active) / Filtration / Rapid Sand

1.	What type of filtration media system is being utilized?	Dual Media
	Rapid Sand. 44 inches of filter media. 14" Anthracite, 14" sand, 4 " coarse sand and 12" support gravel	
2.	Number of filters?	8
	filter 6 is down	
3.	Filter area (sq. ft. / filter)	470
4.	What is the current average filtration rate (gpm/sq. ft.)?	2.2
	Design is 3 gpm/sq.ft.	
5.	Backwash Frequency?	every 100 hrs
6.	How are backwash cycles triggered?	Filter Run Times
7.	Primary source of backwash water?	finished
8.	Secondary source of backwash water?	
9.	Back wash rate (gpm/sq. ft.)	18
10.	Is there a written Standard Operating Procedure for the backwash?	Yes
11.	Was a backwash cycle observed during this inspection?	Yes
12.	Are media depths checked against design standards at least once per year?	No
13.	Date of last media change-out?	04/01/1999

TROY CITY - (Active) / Filtration / Rapid Sand

14.	*Are each of the following media conditions acceptable:*	
15.	- media growth?	Yes
16.	- mud accumulation?	Yes
17.	- media loss?	Yes
18.	Has the filtration rate remained at or below design flow at all times during the past 12 months?	Yes
19.	Are filter run times consistent throughout the year?	Yes
20.	Is filter-to-waste practiced at the end of the backwash?	No
21.	*Are filters equipped with operable:*	
22.	- Air Scour System?	Yes
23.	- Surface Wash System?	Yes
24.	- Loss of Head Gauges?	Yes
25.	- Flow Meters?	Yes
26.	- Rate of flow valves / controls?	Yes
27.	- Sampling Taps?	Yes
28.	- Individual Turbidimeters (if required)?	NA
29.	Is the system a surface water required to have filter effluent turbidimeters?	No
30.	*WASTEWATER*	
31.	Is any of the backwash water recycled back into the treatment process?	Yes
31.01	If yes, where does the stream re-enter the treatment train?	front of plant
31.02	What volume of water is recycled per day (gal.)?	
	approximately 1%	
31.03	Is this less than 10% of the total flow for the plant?	Yes
33.	How is disposal provided for backwash water?	Lagoons
34.	Are all visible surfaces free from excessive corrosion, cracks or other signs of deterioration including leaks (including control valves)?	Yes
35.	General Condition of Filtration Equipment?	Acceptable
36.	Is the treatment unit in a condition that represents an immediate threat to health, safety or in danger of failure?	No

TROY CITY - (Active) / Filtration / Rapid Sand

37.	General Comments 1:	
38.	General Comments 2:	
39.	General Comments 3:	

TROY CITY - (Active) / Lime - Soda Ash Addition / Lime - Soda Ash Addition

1.	Is Lime Fed?	Yes
1.01	Form of lime used:	Quicklime / Unslaked Lime
1.02	Treatment goals:	120 mg/l
1.03	Are treatment goals being met?	Yes
1.04	Application Point	clarifer center
1.05	Dosage (mg/L):	265
1.06	Are feeders free from corrosion or other signs of deterioration?	Yes
1.07	General Condition of Lime Feed Equipment?	Acceptable
1.08	Is the treatment unit in a condition that represents an immediate threat to health, safety or in danger of failure?	No
1.09	General Comments 1:	
1.1	General Comments 2:	
1.11	General Comments 3:	
2.	Is Soda Ash fed?	Yes
2.01	Treatment goals:	softening
2.02	Are treatment goals being met?	Yes
2.03	Application Point:	upflow clarifer
2.04	Dosage (mg/L):	5
2.05	Are feeders free from corrosion or other signs of deterioration?	Yes
2.06	General Condition of Soda Ash Feed Equipment?	Acceptable
2.07	Is the treatment unit in a condition that represents an immediate threat to health, safety or in danger of failure?	No
2.08	General Comments 1:	
2.09	General Comments 2:	
2.1	General Comments 3:	

TROY CITY - (Active) / PH Adjustment / PH Adjustment

1.	Chemical Fed:	Carbon Dioxide
2.	Feed Solution Strength:	
3.	Application Point:	filter influent
4.	Dosage (mg/L):	30
5.	Treatment Goals (pH, stability, etc.)	stability 8.8-8.9
6.	Are treatment goal being met?	Yes
7.	General condition of pH adjustment Equipment?	Acceptable
8.	Is the treatment unit in a condition that represents an immediate threat to health, safety or in danger of failure?	No
9.	General Comments 1:	
10.	General Comments 2:	
11.	General Comments 3:	

TROY CITY - (Active) / PH Adjustment / Recarbonation

1.	Carbon Dioxide Dosage (mg/L):	30
2.	Treatment Goals (pH, stability, etc.)	stability
3.	Are treatment goal being met?	Yes
4.	Have there been any modifications to the recarbonation process since the last survey?	No
6.	Can samples be easily collected from the influent and effluent of the recarbonation basin?	Yes
7.	Is the recarbonation basin operated so that it provides a minimum of 20 minutes detention time?	NA
8.	Is the diffuser submergence appropriate and dispersion sufficient?	Yes
9.	If located inside, is carbon dioxide detector and ventilation fan present and operable in the room with the recarbonation basin?	NA
10.	How often is the basin cleaned?	as needed
11.	Are all visible surfaces free from excessive corrosion (steel), cracks (concrete) or other signs of deterioration.	Yes
12.	General Condition of Recarbonation Equipment?	Acceptable

TROY CITY - (Active) / PH Adjustment / Recarbonation

13.	Is the treatment unit in a condition that represents an immediate threat to health, safety or in danger of failure?	No
14.	General Comments 1:	
15.	General Comments 2:	
16.	General Comments 3:	

TROY CITY - (Active) / Sedimentation / General

1.	Have there been any modifications to Sedimentation / Clarification equipment since the last survey?	No

TROY CITY - (Active) / Sedimentation / Clarifier/Solids Contact Unit

1.	Treatment Goals (settled turbidity, TOC removal, etc.)	turbidity
2.	Are treatment goals being met consistently?	Yes
3.	Are all visible surfaces free from excessive corrosion (steel), cracks (concrete) or other signs of deterioration.	Yes
4.	If there are more than one unit, how are the units usually operated?	Series
	2 that alternates yearly	
5.	If there is more than one unit, can one of the units be taken out of service without disrupting operation?	Yes
6.	Do the basins appear to be free from short-circuiting?	Yes
7.	Do the basins appear to be operating properly, (where there appears to be adequate settling of flocculated solids)?	Yes
8.	Is sludge removal equipment present and operable?	Yes
9.	How often is sludge removed from the unit?	every 60 minutes
10.	Are mixing devices present and operable?	Yes
11.	If no, is satisfactory mixing of chemicals in the water being achieved?	
12.	*Waste Water*	
13.	Is any of the decant from the sludge waste recycled back into the treatment process?	No
14.	Is suitable ultimate disposal provided for all sludge wastes?	Land Application
15.	General Condition of Clarification Equipment?	Acceptable

TROY CITY - (Active) / Sedimentation / Clarifier/Solids Contact Unit

16.	Is the treatment unit in a condition that represents an immediate threat to health, safety or in danger of failure?	No
17.	General Comments 1:	
18.	General Comments 2:	
19.	General Comments 3:	

Pump Stations / General

1.	Does the PWS contain any pump stations or facilities (low service, high service, distribution etc.)?	Yes
	EHS & West Milton	
1.01	Are there at least two equal and functioning pumping units at each pump facility?	Yes
1.02	Can the demand of each pump facility service area be met by the remaining pumps when the largest unit is out of service?	Yes
1.03	Are pump outputs periodically re-evaluated?	Yes
1.04	*Is each pump discharge line equipped with an operable:*	
1.05	-pressure gauge?	Yes
1.06	-flow meter	Yes
1.07	-sample tap	Yes
1.08	-air release valve (if applicable)	Yes
1.09	*Are all pump facilities free from excessive:*	
1.1	- dirt/clutter?	Yes
1.11	- noise/vibration?	Yes
1.12	- heat or cold?	Yes
1.13	-standing water from leaking pipes/seals?	Yes
1.14	Are all pumps properly lubricated?	Yes
1.15	Do all underground pump facilities contain operable sump pumps or otherwise properly drained/sealed?	Yes
1.16	Are the all controls maintained in good working order?	Yes

Pump Stations / HIGH SERVICE PUMPING - (Active)

1. Purpose of Pump Station: High Service
   6 HS turbine pumps ; 4-1400 gpm pumps and 2-1550 gpm pumps
2. Have any Modifications been made to the station? No
4. How many hours per day does the station run? 18
   approximate
5. What is the maximum number of cycles (on/off) that the station operates?
6. Is supplemental disinfection provided? No
7. Is auxiliary power provided? Yes
7.01 Type of auxiliary power provided? Onsite Generator
8. General Condition of Pump Station? Acceptable
9. Is the pump station in a condition that represents an immediate threat to health, safety or in danger of failure? No
10. General Comments 1:
11. General Comments 2:
12. General Comments 3:

Pump Stations / EHS BOOSTER STATION - (Active)

1. Purpose of Pump Station: High Service
   3 pumps- 1@350 gpm, 2@ 700 gpm peerless pumps. Pumps replaced in 2008 with 1-15hp and 2- 30 hp pumps.
2. Have any Modifications been made to the station? No
   new in 2005-2006
4. How many hours per day does the station run? 24
5. What is the maximum number of cycles (on/off) that the station operates?
   varies by demand
6. Is supplemental disinfection provided? No
7. Is auxiliary power provided? Yes
7.01 Type of auxiliary power provided? Quick-Connect for Portable Generator
8. General Condition of Pump Station? Acceptable
9. Is the pump station in a condition that represents an immediate threat to health, safety or in danger of failure? No
10. General Comments 1:
11. General Comments 2:

Pump Stations / EHS BOOSTER STATION - (Active)

12. General Comments 3:

Auxiliary Power / General

1. Is auxiliary power provided for any water system facilities? Yes
   900 KW diesel at treatment plant,
   350 kw diesel at west well field
   100 kw diesel at east well field
1.01 *Indicate what facilities are provided auxiliary power?*
1.02 -Wells? Yes
1.03 -Treatment Facilities Yes
1.04 -Pump Stations Yes
   except booster station
1.05 -Other?
1.06 - Are auxiliary power systems capable of ensuring required miniumum treatment is provided and all portions of the distribution system maintain pressure even during extended periods of power loss? Yes
   WTP - NO
1.06 Is the auxiliary power activated automatically upon loss of local power? Yes
   WTP - NO
1.07 What is the maximum flow through the treatment facility while on auxiliary power? 6.9 MGD
1.08 Are fuel tanks located such that they do not present contamination or safety hazards? Yes
1.1 Are the auxiliary power units exercised, tested regularly and properly? Yes
1.11 General condition of auxiliary power systems? Acceptable

Storage / GENERAL STORAGE

1. Does the system have storage other than pneumatic pressure tanks? Yes
1.01 Are tanks designed so that they can be isolated without disruptions in the distribution system? Yes
1.02 Are the controls used for maintaining the water level in each of the tanks appropriate and operational? Yes
1.03 Is there equipment to determine the water level in each tank and is it operable? Yes
1.04 Does the water in the tanks turn over at least daily? Yes

Storage / GENERAL STORAGE

1.05	Are physical barriers in place to prevent unauthorized entry at each tank site?	Yes
1.06	Are all visible hatches locked?	Yes
1.07	Have roof penetrations been inspected within the past 6 months?	Yes
1.08	Are access openings overlapping and water tight?	Yes
1.09	*Are air vents:*	
1.1	- Turned downward or covered from rain?	Yes
1.11	- Screened?	Yes
1.12	*Are overflow pipes:*	
1.13	- Properly screened or fitted with an operable flapper gate?	Yes
1.14	- Appropriately drained with a splash pad?	Yes
1.15	Is the area around the tank graded to prevent standing surface water?	Yes
1.16	Following inspection/maintenance are tanks disinfected and sampled in accordance with AWWA C-652?	Yes

Storage / HERRLINGER TANK 1.0 MG - (Active) / TANK DETAILS

1.	Capacity of Tank:	1
2.	Capacity Units:	MGL - Million Gallons
3.	Have any Modifications been made to the tank since last survey?	No
4.	Are all visible surfaces free from excessive corrosion, cracks or other signs of deterioration including leaks?	Yes
5.	Date of last interior inspection:	03/21/2006
6.	Date of Interior cleaning & coating:	03/21/2006
7.	Date of exterior painting:	03/21/2006
8.	What is the interior coating of the tank?	Paint
9.	Are cathodic protection rods utilized for corrosion control?	No
11.	General Condition of Tank?	Acceptable
12.	Is the storage tank in a condition that represents an immediate threat to health, safety or in danger of failure?	No
13.	General Comments 1:	inspected yearly. Cleaned and painted every 8-10yrs

Storage / HERRLINGER TANK 1.0 MG - (Active) / TANK DETAILS

14.	General Comments 2:	built in 1989
15.	General Comments 3:	

Storage / STANFIELD TANK 0.5 MG - (Active) / TANK DETAILS

1.	Capacity of Tank:	0.5
2.	Capacity Units:	MGL - Million Gallons
3.	Have any Modifications been made to the tank since last survey?	No
4.	Are all visible surfaces free from excessive corrosion, cracks or other signs of deterioration including leaks?	Yes
5.	Date of last interior inspection:	08/01/2009
6.	Date of Interior cleaning & coating:	08/01/2009
7.	Date of exterior painting:	08/01/2009
8.	What is the interior coating of the tank?	Paint
		metalized paint
9.	Are cathodic protection rods utilized for corrosion control?	No
11.	General Condition of Tank?	Acceptable
12.	Is the storage tank in a condition that represents an immediate threat to health, safety or in danger of failure?	No
13.	General Comments 1:	has altitude valve
14.	General Comments 2:	Built in 1970
15.	General Comments 3:	

Storage / BARNHART TANK 2.0MG - (Active) / TANK DETAILS

1.	Capacity of Tank:	2
2.	Capacity Units:	MGL - Million Gallons
3.	Have any Modifications been made to the tank since last survey?	No
4.	Are all visible surfaces free from excessive corrosion, cracks or other signs of deterioration including leaks?	Yes
5.	Date of last interior inspection:	08/01/2009
6.	Date of Interior cleaning & coating:	05/20/2003

Storage / BARNHART TANK 2.0MG - (Active) / TANK DETAILS

7. Date of exterior painting: 04/01/1989
8. What is the interior coating of the tank? Paint
9. Are cathodic protection rods utilized for corrosion control? Yes
9.01 If yes, date rods were last changed: 2009
11. General Condition of Tank? Acceptable
12. Is the storage tank in a condition that represents an immediate threat to health, safety or in danger of failure? No
13. General Comments 1:
built in 1989
14. General Comments 2:
15. General Comments 3:

Storage / 4.0 MG CLEAR WELL - (Active) / CLEAR-WELL DETAILS

1. Capacity of Tank: 4
prestressed concrete, baffled
2. Capacity Units: MGL - Million Gallons
3. Have any Modifications been made to the tank since last survey? No
4. Are all visible surfaces free from excessive corrosion, cracks or other signs of deterioration including leaks? Yes
5. Date of last interior inspection:
6. Date of Interior cleaning & coating:
7. Date of exterior painting:
8. What is the interior coating of the tank?
9. Are cathodic protection rods utilized for corrosion control? No
all concrete
11. General Condition of Tank? Acceptable
12. Is the storage tank in a condition that represents an immediate threat to health, safety or in danger of failure? No
13. General Comments 1:
360 minutes for detention time
14. General Comments 2:
Built 1996-97
15. General Comments 3:

TROY, CITY OF DISTRIBUTION - (Active) / General

2. *Indicate what materials are the water lines made of (note all that apply):*
PCCP 1%
3. -Asbestos Cement: No
4. -Ductile Iron: Yes
30%
5. -Galvanized: No
6. -PVC: No
7. -Cast Iron: Yes
60-65%
8. -HDPE: No
9. -Lead: Yes
replaced when found
10. Size of main lines (range):
1.5-24 inch
11. Miles of lines: 135
12. Distribution System Classification? CLASS 2
13. Is the distribution system under separate supervisory control from the WTP? No
15. Are all service connection metered? Yes
16. Do all water mains that provide fire flow have a diameter of at least 6 inches? Yes
17. Is an adequate map maintained of the distribution system? Yes
18. Are the maps updated as changes to the system are made? Yes
19. Is there a computer aided hydraulic model of the distribution system? No
21. *Does the system maintain a depressurization policy which includes the following:*
22. - Public Notice/Boil Order? Yes
23. - Disinfection? Yes
24. - Pressure Testing (if line replacement)? Yes
25. - Flushing? Yes
26. - Bacteriological Testing? Yes

TROY, CITY OF DISTRIBUTION - (Active) / Pressure/Flow

1.	Does the system maintain a minimum working pressure of 35 psi?	Yes
2.	Does the system maintain a minimum pressure of 20 psi at all times, even during peak usage?	Yes
3.	Are separate pressure zones provided?	Yes
4.	Are Pressure Regulating Valves (PRV's) present in the distribution system?	No

TROY, CITY OF DISTRIBUTION - (Active) / Disinfection

1.	Are chlorine residuals tested at least daily in the distribution system?	Yes
2.	Are there an adequate number of sample sites and do they provide a representative sample of system conditions?	Yes
3.	Is the chlorine residual at least 0.2 mg/L free or 1.0 mg/L combined at all points in the distribution?	Yes

TROY, CITY OF DISTRIBUTION - (Active) / Maintenance

1.	Are air relief valves provided where necessary?	No
4.	Is there a service meter calibration & replacement program?	Yes
5.	Are there a sufficient number of isolation valves and blow off valves to effectively shut off and contain affected sections of the distribution system in the case of a contamination event? (at least every block or 800' municipal 1/mile rural)	Yes
6.	Is there a distribution valve exercise program?	Yes
	Needs improvement	
6.01	How often are the valves exercised?	
8.	Is there a water main flushing program?	Yes
8.01	How frequently is distribution system flushing performed?	Annually
8.02	Is there a written set of procedures for conducting and recording system wide unidirectional flushing?	Yes
10.	Are efforts made to minimize dead ends?	Yes
10.01	- Explain efforts:	
12.	Is there a fire hydrant testing program, separate from the line flushing program?	Yes
12.01	If yes, who oversees the hydrant testing?	Fire Department

TROY, CITY OF DISTRIBUTION - (Active) / Maintenance

14.	Does the water system have a program to control the use of fire hydrants?	Yes
15.	Is there an active leak detection program?	Yes
	Aqua line	
16.	Does the system have operable equipment for line location and leak detection?	Yes
	Yes- for line location; No- leak detection	
17.	How many line breaks has the system experienced in the past 12 months?	38
18.	What is the reason for most of the breaks?	Line Age
	ground shifting	
19.	Does the utility perform their own water line repairs?	Yes
19.01	Is there adequate equipment and repair materials in stock?	Yes
19.02	If repair materials are not kept in stock, can they be obtained in a reasonable amount of time?	Yes
19.03	Are excavation safety practices in place and followed?	Yes
21.	If contractors perform repairs, do they respond in a reasonable amount of time?	Yes
22.	General Condition of Distribution System?	Acceptable But Needs Improvement
	Improvements on valve exercise	
23.	Is any part of the distribution system in a condition that represents an immediate threat to health, safety or in danger of failure?	No
24.	General Comments 1:	
25.	General Comments 2:	
26.	General Comments 3:	

Management / General

1.	*Is management familiar and able to discuss the following:*	
2.	- OEPA requirements noted in previous inspections?	Yes
3.	- System operational and maintenance needs?	Yes
4.	Is there a standard procedure for investigating complaints of poor water quality or low pressure.	Yes
5.	Are complaints responded to within 8 hours?	Yes

Management / General

6.	Have any complaints received since the last sanitary survey been confirmed as representing a system or health hazard?	No
8.	What is the percentage water loss within the distribution?	
9.	Is the unaccounted-for-water-loss less than 15%?	No
10.	Is there a master plan showing proposed upgrades/improvements of the water system infrastructure (i.e. 5 year plan)?	Yes
11.	Are there a sufficient number of certified operators for all facilities (Distribution & Treatment Plants)?	Yes

Management / Operations and Maintenance

1.	Is there an overall Operations and Maintenance (O&M) program/manual.	Yes
2.	Is there a budget to implement the O&M program?	Yes
3.	Is there a preventive maintenance (PM) program?	Yes
3.01	*Does the PM program include the following:*	
3.02	- manufacturers service and repair manuals?	Yes
3.03	- adequate tools and equipment?	Yes
3.04	- scheduling and tracking?	Yes
3.05	Is the PM program properly implemented and effective?	Yes
4.	Are operation and maintenance records maintained for the PWS/treatment plant(s)?	Yes
4.01	Are the records housed and maintained in such a manner as to be protected from weather damage and guarantee authenticity and accuracy?	Yes
4.02	Are records accessible onsite for 24 hour inspection by Ohio EPA or emergency personnel?	Yes
4.03	Do records indicate the date and times of arrival/departure for the operator of record?	Yes
4.04	*Is the following information maintained within the O&M records:*	
4.05	-Identification of the PWS and/or treatment plant?	Yes
4.06	-Specific operation and maintenance activities that affect or have the potential to affect the quality or quantity of water produced/conveyed?	Yes

Management / Operations and Maintenance

4.07	-Results of test performed and samples taken, unless documented on laboratory sheets?	Yes
4.08	- Performance of preventative maintenance and repairs or request for repair of critical equipment or facilities.	Yes
4.09	- Identification of persons making entries and date of entry.	Yes

Management / Backflow Prevention

1.	Does the water system have a cross control ordinance?	Yes
2.	Are other legal mechanisms used to control cross-connections?	Yes
2.01	*Indicate all mechanisms used:*	
2.02	- Service Contract?	Yes
2.03	- Rental Agreement	Yes
2.04	- By-Laws	Yes
2.05	- Other (Explain in notes)?	Yes
4.	*Does the cross control program include the following:*	
5.	- require installation and operation of appropriate type of approved backflow prevention devices?	Yes
6.	- right-of-entry for inspection?	Yes
	Miami County	
7.	- inspections for all installed backflow prevention devices every 12 months?	Yes
8.	- discontinuance of service to any facility where suitable or operable backflow prevention has not been provided for a cross connection?	Yes
9.	- prohibit direct connection of booster pumps on 1 to 3 family dwellings and require appropriate protection and inspection on all other booster pump installations.	Yes
10.	- mechanism to ensure that customers with auxiliary water systems (i.e. private wells) have the appropriate backflow protection and inspection?	Yes
11.	*Backflow Program Implementation*	
12.	Who does the water system accept to perform the annual inspections on the backflow prevention devices?	Licensed Plumber
13.	Have all existing customers required to have backflow prevention been identified?	Yes

Management / Backflow Prevention

14.	Is there a mechanism to identify the need for backflow prevention on new service connections?	Yes
15.	Does the system periodically resurvey all customers to ensure that cross-connections have been identified?	Yes
16.	Are backflow preventers at treatment plants and other facilities owned by the water system/municipality tested every 12 months?	Yes
17.	Are air gaps provided on all bulk water sale stations?	Yes
18.	If not, what is being done to protect the water system?	
19.	Who in the organization is trained in cross connection control?	
20.	Is the backflow program adequate?	Yes

Management / Safety

1.	Do operators consider their environment a safe place to work?	Yes
2.	Is Personal Protective Equipment (PPE) provided?	Yes
3.	Have the operators received training in safety procedures and equipment (including confined space entry, if necessary)?	Yes
3.01	If yes, is safety training an on-going and regular program?	Yes

Management / Security

1.	Are all structures/facilities protected from unauthorized entry?	Yes
2.	Does the system patrol and inspect wellfields, source intakes, buildings, storage tanks, equipment and other critical components on a regular basis?	Yes
3.	Is there lighting around the critical components of the water system?	Yes
4.	Has the water system management met with local neighbors to enlist their support?	NA

Management / Source Water Protection

1.	What was the susceptibility to contamination determination for this system?	High
2.	Are procedures in place to prohibit the application of pesticides, herbicides and fertilizers around the source water?	Yes
3.	Has a Source Water Protection Plan (SWPP) been developed?	Yes

Management / Source Water Protection

3.01	Is the plan being implemented?	Yes
3.02	Who is the designated SWPP coordinator?	Tim Ray
3.03	Is the plan available to all system personnel (& OEPA)?	Yes

Management / Emergency Response

1.	Does the PWS have a written Contingency Plan ?	Yes
1.01	Has been updated within the past year?	Yes
1.02	*Does the Contingency Plan address the following situations/issues:*	
1.03	- operator absence?	Yes
1.04	- flood?	Yes
1.05	- power outage (short & long term)?	Yes
1.06	- chemical contamination of supply?	Yes
1.07	- bacterial contamination of supply?	Yes
1.08	- loss of water supply?	Yes
1.09	- loss of water pressure?	Yes
1.1	- equipment malfunction?	Yes
1.11	- critical water users?	Yes
1.12	- public notification?	Yes
1.13	- other?	
1.14	Are all critical personnel, including community Emergency Responders (i.e. Local EMA, Law Enf. & Fire), familiar with the Contingency Plan?	Yes
1.15	Is there an Emergency Contact List for the Contingency Plan?	Yes
1.16	Is implementation of the Contingency Plan practiced to ensure that it is workable?	Yes
2.	Does the system have an interconnection with a neighboring water system that could be used as an alternative water source in the case of an emergency?	Yes
3.	Is the PWS a member of the Ohio Water/Wastewater Agency Response Network (WARN)?	Unknown

Management / Financial

1.	Are customers billed for water?	Yes
1.01	When was the last user fee, user charge or rate system adjustment?	

Management / Overall PWS Management

1.	General Rating of System Management:	Acceptable
2.	Is the overall management creating a condition that represents an immediate threat to health, safety or failure of any part of the public water system not already noted.	No
3.	General Comments 1:	
4.	General Comments 2:	
5.	General Comments 3:	

Appendix E – CDM Projected Cost for New Piqua WTP

Single Stage Coagulation/Lime Softening and Post-Filter GAC Contactors
New Water Treatment Plant

Project Cost Estimate for Alternative 1D

Description		Cost
WTP		
Site Work	$	2,720,000
Onsite Filter Backwash Facility	$	330,000
Yard Piping	$	720,000
Chemical Building	$	3,600,000
Flocculation Basins	$	900,000
Sedimentation Basins	$	1,890,000
Recarb Basins	$	520,000
Filter/Admin/Pump/GAC Building	$	7,870,000
Clearwells	$	2,340,000
Subtotal	**$**	**20,890,000**
Contingencies and Engineering	$	5,370,000
Project Total	**$**	**26,260,000**
Offsite Work		
Raw Water PS	$	1,010,000
Gravel Quarry PS Improvements	$	280,000
24" Raw Water Piping	$	1,170,000
12" Gravel Quarry Raw Water Piping	$	100,000
24" Finished Water Piping	$	1,250,000
6" Sludge	$	190,000
Subtotal	**$**	**4,000,000**
Contingencies and Engineering	$	1,365,000
Project Total	**$**	**5,370,000**
Overall Project Cost	**$**	**31,630,000**

Annual O&M Cost Summary

Description		Cost
Power	$	700,000
Chemical	$	264,000
Sludge Disposal	$	100,000
GAC Replacement*	$	360,000
Replacement Parts and Materials	$	166,000
Total Annual O&M Cost	**$**	**1,590,000**
20-year Present Worth**	**$**	**26,000,000**

**Assumes one GAC replacement/yr. Costs will decrease with seasonal use of GAC.*
*** Interest rate = 2.1%, Uniform Series Present Worth Factor = 16.19*

Appendix F – Document Inventory

Troy/Piqua Water Study
Document Inventory

Appendix F

Item #	Reference	Item	Content
1	P-01 (White Binder)	(City of Troy) Source Water Assessment and Protection Program Update August 2010 Binder	Report: Introduction; SWAP Area Delineation; Potential Contaminant Source Inventory; References Appendices: City of Troy production Well Logs; Model Sensitivity Report; Environmental Data Resources Reports; Land Use and Zoning Maps; Oil and Gas Well Maps and Logs; Areas Serviced by Private Septic Systems; Groundwater Flow Model Files.
2	P-02 (Manila Folder in Black Binder)	Black & Veatch 2011 Folder	Contract - Agreement Worksheet; Work Orders 2011-1 & -2 (drafts) Report: White Paper Draft, Piqua - Troy, Water System Interconnect March 12, 2011; Chronology Appendix Report: Evaluation of System Improvements for Water Service to Piqua, March 2011; Area Map; Opinion of Probable Construction Costs, March 2011 Form: (Ohio EPA) Water Supply Revolving Loan Account (WSRLA) Nomination Form Hydrant Flow Test Data; Contract; Miscellaneous Certificates, Meeting Agendas, Water User Tables, GIS Maps, and Memorandums
3	P-03 (Black Binder)	Piqua Interconnect Binder	Proclamation of City Status for Troy and corresponding Census Data Report: Evaluation of System Improvements for Water Service to Piqua, March 2011 PowerPoint: City Commission Work Session, New Water Source Exploration, December 9, 2010 Proposal: Wellfield Development Phase 2, Additional Services Report: Piqua Municipal Water System Source Water Study, April 2010 Report: Piqua Municipal Water System Feasibility Study, February 2009 Report: Water Treatment Plant Assessment & Master Plan, Piqua, Ohio 2007 Ordinances amending the Piqua Code Final Guidelines for Implementation of the Drinking Water State Revolving Fund Program Report: Troy Municipal Utilities, Troy, Ohio, Preliminary Feasibility Study, February 27, 2006
4	P-04 (Binder Clip)	Budget and Ohio EPA Class IV License Application	City of Troy Ohio, 2011 Budget - Expense Detail, August 29, 2011 Application: Ohio EPA Class IV License
5	P-05 (Manila Folder)	Piqua Folder	City of Piqua - Department of Purchasing - Bid Ohio EPA Limited Scope Site Visit 2006: City of Piqua, Miami County, Community Water System PWS I.D. #5501211 Attachment A to Agreement for Engineering Services; Resolution of Support Re: Water Service to Piqua; Chemical SSR Summary; Comparisons of Troy and Piqua Water Systems; Piqua Municipal Water System Estimated Ten Year Cash Forecast; Expense Budgets Newspaper: Troy Daily News (June 24,2011)

Troy/Piqua Water Study
Document Inventory

Appendix F

Item #	Reference	Item	Content
6	P-06 (Yellow Folder)	Piqua - 2009/2010 Folder	Calculation of Piqua Estimated Buy In (West Milton Historical Payment Basis); 2010-2011 Projected Revenues, Enterprise Funds Report: White Paper Draft, Piqua - Troy, Water System Interconnect March 12, 2011 Resolution No. R-23-2009: A Resolution of Support for the Principles of a Water Agreement by the City of Troy, Ohio to Provide Water Service to the City of Piqua, Ohio and Declaring an Emergency; Corresponding Agreements and Amendments Loan Amortization Results; City of Troy - Bottom of Filter Stats - 2009; Miscellaneous Estimates PowerPoint: City Commission Work Session, New Water Source Exploration, December 9, 2010 City of Tipp City Electric Rate Calculation Piqua City Commission Work Session, April 1, 2010
6 (Cont)	P-06 (Yellow Folder)	Piqua - 2009/2010 Folder (tabbed section)	Troy City Council Water Proposal (Piqua Response R-23-2009) Resolution R-23-2009 (Troy R-23-2009) Piqua Municipal Water System, Estimated Ten Year Cash Forecast; City of Piqua, Water Department, 2009 Annual Report (2009 10-yr Performance) City of Piqua, Ohio: Governmental Fund Balances, Debt Coverage Business Type Activities, Operating Indicators by Function/Program (Tables) Newspapers and Articles (Atrazine) EPA Violation (12/2006 EPA Violation)
7	P-07 (Green Hanging Folder)	Consolidation Folder	Report: White Paper Draft, Piqua - Troy, Water System Interconnect May 6, 2011; Chronology Appendix Piqua City Commision, Regular City Commission Meeting Minutes City of Piqua Ohio Monthly Water Rates In the Bluegrass State - Water System Consolidation Works White Paper - Consolidation for Small Water Systems: What are the Pros and Cons
8	E-1	Monthly VOCs_1.xls {Troy}	Monthly VOCs_1.xls
9	E-2	2003 (Folder) {Troy}	2003 TOTALS.xls LOW HIGH SERVICE PUMP HOURS.xls PUMPAGE.xls RAW WATER.xls TEMP BENCHES.xls WELL HOURS.xls
10	E-3	2004 (Folder) {Troy}	2004 TOTALS.xls LOW HIGH SERVICE PUMP HOURS.xls PUMPAGE.xls RAW WATER.xls TEMP BENCHES.xls WELL HOURS.xls

Troy/Piqua Water Study
Document Inventory

Appendix F

Item #	Reference	Item	Content
11	E-4	2005 (Folder) {Troy}	2005 TOTALS.xls LOW HIGH SERVICE PUMP HOURS.xls PUMPAGE.xls RAW WATER.xls TEMP BENCHES.xls WELL HOURS.xls
12	E-5	2006 (Folder) {Troy}	2006 TOTALS.xls LOW HIGH SERVICE PUMP HOURS.xls PUMPAGE.xls RAW WATER.xls TEMP BENCHES.xls WELL HOURS.xls
13	E-6	2007 (Folder) {Troy}	07 08.pdf 2007 TOTALS.xls 2007 Water Fund Expenses.pdf LOW HIGH SERVICE PUMP HOURS.xls PUMPAGE.xls RAW WATER.xls TEMP BENCHES.xls WELL HOURS.xls
14	E-7	2008 (Folder) {Troy}	07 08 Water Revenues.pdf 2008 Pumps & Wells.xls 2008 TOTALS.xls 2008 Water Fund Expenses.pdf PUMPAGE.XLS PUMPAGE_Auditor.XLS RAW WATER.xls TEMP BENCHES.xls
15	E-7.1	Discontinued Files (Folder) {Troy}	LOW HIGH SERVICE PUMP HOURS.xls WELL HOURS.xls
16	E-8	2009 (Folder) {Troy}	2009 Pumps & Wells.xls 2009 TOTALS.xls 2009 Water Fund Expenses.pdf 2009 Water Revenues.pdf e-DWR Its_a_secret.doc e-DWR New User Account.doc Miami_County Consumption.xls Monthly Well Flows.xls Monthly_Chemical_Dosage.xls PUMPAGE.xls RAW WATER.xls TEMP BENCHES.xls
17	E-8.1	2009 Bench Sheets (Folder) {Troy}	Contains folders Jan 2009 through December 2009 each with excel files for every date in that month. The excel files contain City of Troy - Water Treatment Plant - Operator Bench Sheets
18	E-8.2	2009_Set-Ups (Folder) {Troy}	Contain the Daily Raw Water Influent Analysis excel sheets from 09-2009 to 12-2009 and a Blank Raw Water Influent Bactee.xls
19	E-8.3	Lab Report Spreadsheets (Folder) {Troy}	Monitoring Wells (empty folder) Plant_Tap & Finished_Water (Plant Tap Detections.xls) Production Wells (Monthly VOCs_1.xls) UCMR2 (PWS Query Results (SS-1910) Public Water System (PWS) SDWARS.mht)
20	E-8.4	Monthly Pumpages (Folder) {Troy}	MONTHLY Plant Pumpage.xls ODNR Raw Water Withdrawal Rpt.pdf

Troy/Piqua Water Study
Document Inventory

Item #	Reference	Item	Content
21	E-9	2010 (Folder) {Troy}	2010 Annual Bulk Water.xls 2010 Pumps & Wells.xls 2010 TOTALS.xls 2010 Water Fund Expenses.pdf Copy of WTP Projects List1.xls EHS BoosterStationStats.xls Monthly Well Flows.xls ODNR_Rpt_2010.pdf Outside Lab Results.xls PUMPAGE.xls RAW WATER.xls STEWART'S HOURS.xls TEMP BENCHES.xls Troy_OH Well_Info 2010.pdf Well Set-Ups -2010.xls
22	E-9.1	BULK WATER (Folder) {Troy}	2009 Annual Bulk Water.xls 2010 Annual Bulk Water.xls 2010 Dec Bulk Water.xls
23	E-9.2	Consumption_Rpts (Folder) {Troy}	Feb-2010.csv Feb-2010.xls Jan-2010.xls Largest Users - 2010.xls Manual Read Meters.xls
24	E-9.3	Shut-Off List (Folder) {Troy}	Contains folders August through December each with excel files. The excel files are Disconnect Lists with a date.
25	E-9.4	Water Distribution (Folder) {Troy}	New service connections 2010.xls Taps Made by Year.xls
26	E-10	2011 (Folder) {Troy}	2011 Pumps & Wells.xls 2011 TOTALS.xls Annual Finished Water Stats.xls EHS BoosterStationStats.xls EHS BoosterStationStats.xlsm Monthly Well Flows.xls Monthly Well Flows.xlsm PUMPAGE.xlsx PUMPAGE-Do not use.xls RAW WATER.xlsm RAW WATER-Do not use.xls TEMP BENCHES.xls Well Set-Ups -2011.xls WTP Projects List1.xls
27	E-10.1	Shut-Off List (Folder) {Troy}	Contains folders January through September each with excel files. The excel files are Disconnect Lists with a date. IMG_0030.pdf

Troy/Piqua Water Study
Document Inventory

Appendix F

Item #	Reference	Item	Content
28	E-11	PiquaProposal (Folder)	4RB- 1.5 MGD @ 60 PSI BOOST.pdf 5RB- 2MGD @ 60 PSI BOOST.pdf 2009cafr.pdf APPENDIX C of DWAF Draft.doc Copy of Piqua's Water Proformas.xls DDN 4-2010 article.doc Direct Operational Costs.doc DSwan Feb_2011.xls DWAF_nomination_form_2012.doc Greater Cincinnati Water Works_Independent News Story.doc Lawsuit_Filed Feb_2010.doc Loop_Map.pdf Ltr re Troy water offer 6-18-09.doc Ltr re Troy water offer 6-18-091.doc memo to baker re piqua water agreement resolution (final)1.doc Memo to CC re Troy Water 6-10-09.doc NEW WASHINGTON.doc
28 (Cont)	E-11	PiquaProposal (Folder) (cont)	Notes from the back row March_17_09.doc OEPA_Discussion_Notes March_2009.doc outline of piqua water comments to committee April_27_09.doc PDC Article 2_24_09.doc PERFORMA 4 OPTIONS Feb_2009.xls Piqua 2009 Report Recap.xls Piqua City Commission Work Session March_17_2009.doc Piqua R-39-09.doc.wps Piqua_Call 5-7-2011.pdf Piqua_Call Dec_2010.doc Project_Update Oct_2010.doc Proposed Water Pro formas 5-14-09.pdf Re_Pro_Forma 4 OPTIONS Feb_2009.xls Re_Pro_Forma TROY OPTIONS Feb_2009.xls Report Reviews.xls Troy BPS Proposal for Piqua.doc Troy Resolution.pdf
29	E-11.1	B&V (Folder) {Troy}	B&V Eval Rpt Mar_2011.pdf B&V Troy Costs Evaluation MAR_2011.pdf
30	E-11.2	CDM (Folder) {Piqua}	CDM Oct_2010 Cost_SprdSht.pdf CDM Oct_2010 Pg3.pdf
31	E-11.3	Hydrant Flows (Folder) {Troy}	2-28-2011 Hyd_Flow_Locations.pdf Hyd421_TrSqE 2-28-2011.pdf Hyd579_ExFmRd 2-28-2011.pdf
32	E-11.4	Maps (Folder) {Troy}	Troy I75_Rte41.docm Troy I75_Rte55.docm Troy_River_Crossings.docm
33	E-11.5	NAWA (Folder)	Copy of Electric Bill.pdf NAWA 2009 -2018 Cap Budget.XLS NAWA 2009 budget.xls
34	E-11.6	News_Releases (Folder)	County will send sewage to Marietta 5-13-2011.doc Drinking water safe, but threats remain.mht Feb_3_2011.pdf Feb_27_2011TDN_Editorial.pdf NYTimes_Atrazine_Article Aug_24_09.mht

Troy/Piqua Water Study
Document Inventory

Item #	Reference	Item	Content
35	E-11.7	Piqua City Commission (Folder)	4-1-2010 Minutes Work_Session.doc 12-9-2010 Piqua WorkSession Presentation.pdf 12-9-2010 Work Session Minutes.pdf 12-21-2009 COMM_Mtg.doc 2009 Annual Rpt.pdf 2011 Water Budget.pdf bid_ifb1035_chemicals_bid_tab.pdf Feb 23 2009 Work Group Mtg.doc Nov 16 2009 wells.doc Piqua Comm Dec 2010 Work SessionPPt.pdf Piqua Commission 6_21_11.pdf Piqua Commission 7_19_11.pdf
36	E-11.8	Preps (Folder)	Copy of Piqua regional water buyin calc.xls NAWA Operating Expenses May_2011.doc New Planat Critical Points - Piqua.doc Piqua 2009 Report Recap.xls Satellite Connection Notes - Troy.doc Troy WTP Direct Costs May_2011.xls
37	E-11.9	White Papers (Folder)	2_System Advantages.doc 3-17-2011 OEPA PubInfoRqst.doc 12-9-2010 Piqua WorkSession Presentation.pdf B&V Troy Costs Evaluation MAR_2011.pdf B&V Troy Recommendations Mar_2011.doc Brandenburg 2009 Study.pdf CDM Expend GrndWater.xls CDM_Anticipated_Costs OCT_2010.pdf Chronology Appendix.doc Executive Summary.doc J&H Piqua 2007 Study.pdf Mar_2011 White Paper Draft.doc May_2011 White Paper Draft.doc Piqua-Troy Comparisons.xls raucher02.doc Reference List.doc
38	E-12	RDP ACE 2011 (Folder)	Hydrated Lime Slaker.pptx RDP Slaker Installation List.pdf Tekkem Slaker.pptx
39	E-12.1	Supporting Lime Studies (Folder)	AWWA ACE 2010 (Sunny Wang) 062510.pdf Carmeuse Lime Paper.pdf
40	E-12.2	Supporting Studies (Folder)	AWWA ACE 2010 (Sunny Wang) 062510.pdf Carmeuse Lime Paper.pdf OCWD Pilot Program.pdf
41	E-12.3	Video (Folder)	RDP in Margate FL.mov RDP in Roseville.mov Slaker Owner Reviews.mov
42	E-13	Sanitary Survey (Folder) {Troy}	2007 Sanitary Survey Inv Form.doc 2010 Survey Worksheets.pdf Fluoride Facts ADHA.doc Inv Form (2).doc large survey.xls
43	E-13.1	2010 (Folder) {Troy}	Final Rpt & Ltr May_2010.pdf
44	E-14	Test Holes 2009 (Folder) {Troy}	TroyReport MAY_2009.pdf
45	E-15	WTP_Drawings (Folder) {Troy}	Plant_Elevations.pdf WTP GPS Points.xls WTP-Clear Well Sections and Details0001.TIF WTP-Clear Well Yard Piping0001.TIF WTPSchematic.JPG
46	E-15.1	Asset Management (Folder)	WTPElectricalFeatures.xls

Troy/Piqua Water Study
Document Inventory

Item #	Reference	Item	Content
47	E-16	City of Piqua (Folder)	State Audits.msg RE City of Piqua Data Request.msg FW City of Piqua Data Request.msg Water Debt Schedules.xls Top Largest Water Customers.xls Forecast & Various Other Data.xls WSLRA Loan Agreement.pdf Water System Feasibility Study.pdf Sample billing by type.pdf List Construction Projects.pdf List assets by year.pdf Customers by meter size & Ordinance & Rate Schedule.pdf City_of_Piqua_State Audit 2010.pdf City_of_Piqua_State Audit 2009.pdf City_of_Piqua_State Audit 2008.pdf Piqua Water System Proforma.pdf Piqua Water Distribution Map.tif 20111024130115990.tif 20111024130021100.tif info for paul.doc
48	E-17	City of Troy (Folder)	Troy files.msg State Audits.msg More of the Troy files.msg Missing information.msg Last of the Troy files.msg FW Final bunch.msg FW Data Requests - City of Troy.msg Final bunch.msg Data Requests - City of Troy.msg CIty of Troy second bunch.msg 2012 Troy WTP Budget.msg 2007 Sanitary Survey Inv Form.doc Troy WTP PerMG Costs.docx Troy Piqua Team Contacts.xlsx Final Water Performa.xls Copy of Annual Finished Water Stats.xls 2010-2018 lists1.xls
48 (cont.)	E-17	City of Troy (Folder) (cont.)	Water Usage Info.pdf Water Service Map.pdf Water Ordinance.pdf Water Budget Pages.pdf Final Troy Fact Sheet 9-30-2011.pdf Final Rpt Ltr May_2010.pdf Ffixed Asset List.pdf City of Troy State Audit 2010.pdf City_of_Troy_State Audit 2009.pdf City_of_Troy_State Audit 2008.pdf Auditor information.pdf 2007 SanSurv Rprt.pdf 2004 SanSurv Rprt.pdf

Troy/Piqua Water Study
Document Inventory

Appendix F

Item #	Reference	Item	Content
49	E-18	Joint Documents (Folder)	RE Troy Piqua Schedule and Level of Effort.msg OCT 5 PRE-WORKSHOP WITH PIQUA TROY.msg FW Troy and Piqua Ohio.msg FW NAWA.msg Appendices and Information on Vandalia-Tipp City Agreement.msg FW Joint Venture Model for Troy Piqua.msg Piqua-Troy Pre-Workshop Mtg Agernda 100511.docx Piqua and Troy Basic Data Revised100411.doc Piqua and Troy Basic Data RevConR.doc Troy Piqua Pre-Workshop 100511.pptx Piqua- Troy Level of Effort8-30-11.xlsx Schedule - Piqua & Troy Joint Water Supply Utility Study.pdf NAWA Joint Venture Agree. 3-2002.pdf B&V Engineer Report.pdf